8500 Series Mobile Computer

Version 2.00

CIPHER LAB

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Copyright Notice

FCC Regulations

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Important Safety Precautions

- RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE
- DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS
- The use of any batteries or charging devices, which are not originally sold or manufactured by CipherLab, will void your warranty and may cause damage to human body or the product itself.
- The charging and communication cradle uses an AC power adaptor. A socket outlet shall be installed near the equipment and shall be easily accessible. The power adaptor should comply with L.P.S test. Make sure there is stable power supply for the mobile computer or its peripherals to operate properly.
- DO NOT disassemble, incinerate or short circuit the battery pack.
- DO NOT expose the mobile computer or the battery pack to any flammable sources.
- Under no circumstances, internal components are self-serviceable.
- Per FDA and IEC standards, the scan engines described in this manual are not given a laser classification. However, the following precautions should be observed:

CAUTION

This laser component emits FDA/IEC Class 2 laser light at the exit port. Do not stare into beam.

Care & Maintenance

- The 8500 Series is intended for industrial logistics use. The mobile computer is rated IP 64, however, it may do damage to the mobile computer when being exposed to extreme temperatures or soaked wet.
- When the body of the mobile computer gets dirty, use a clean and wet cloth to wipe off the dust. DO NOT use/mix any bleach or cleaner. Always keep the LCD dry.
- For a liquid crystal display (LCD) or touch screen, use a clean, non-abrasive, lint-free cloth to wipe dust off the screen. DO NOT use any pointed or sharp object to move against the surface.
- Battery disposal – For green-environment issue, it is important that batteries should be recycled in a proper way.
- If you want to put away the mobile computer for a period of time, download the collected data to a host computer, and then take out the battery pack. Store the mobile computer and battery pack separately.
- When the mobile computer resumes its work, the main and backup batteries will take a certain time to become fully charged.
- If you shall find the mobile computer malfunctioning, refer to the Troubleshooting section for self help first.
- If the problem persists, write down the specific scenario and consult your local sales representative.

Getting Started

Below are instructions of how to have the mobile computer ready to work. This scenario makes use of a cradle, which may be replaced by the 4-slot battery charger and other interface to PC.

- Set up the cradle for initial charging.
- Install the battery pack to the mobile computer, and then seat the mobile computer in the cradle for charging. You may charge a second battery pack at the same time.
- When charging is done, turn on the mobile computer and enter the **System Menu** for system configuration, downloading programs and font file, and so on.
- Before downloading, you must connect a serial cable between the cradle and a host computer.

  Refer to the **System Menu** > **6. Load Program** for more information.
- After charging and downloading, the mobile computer is ready for use.

  Install the hand strap or pistol grip if necessary.

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Preface

Answering heavy industrial demands for robust, versatile and high performance computers, the 8500 Series Mobile Computer is specifically designed for all-day, everyday use as well as for data-intensive applications in harsh environments.

This line of product comes with built-in Bluetooth wireless technology and allows for optional modules for 802.11b/g as well as GSM/GPRS, enabling all the time, anywhere applications and seamless real time sharing of performance. The 8500 Series is bundled with powerful and rich features to ensure success in timely processing of information, even in rigorous industrial environments, and thus, makes an ideal choice for a wireless solution in either increasing business flexibility or answering the demanding needs of heavy-duty mobile computers. Being programmable, this handy device can run custom applications or terminal emulation applications.

This manual serves to guide you through how to install, configure, and operate the mobile computer. We recommend you to keep one copy of the manual at hand for quick reference or maintenance purposes. To avoid any improper disposal or operation, please read the manual thoroughly before use.

Thank you for choosing CipherLab products!

Revision History

Version	Release Date	Notes
2.00	May 19, 2007	New release
1.07	Oct. 31, 2006	◆ Modified: section 1.5.9 List by standards for RFID tags
		◆ Modified: section 1.5.10 Bluetooth specification
		◆ Modified: section 4.1.7 Bluetooth Menu > Security – max. 16 characters for PIN
1.06	July 27, 2006	◆ Modified: section 1.3.9 Reader – RFID (add ICODE)
		◆ Modified: section 2.5.2 Front Panel (LEDs of cradle)
		◆ New: section 4.1.8(2) System Menu > IR Network Menu
1.05	June 22, 2006	◆ Modified: section 1.3.9 Reader – RFID
		◆ Modified: section 4.1.1 Information – add RFID version
1.04	June 16, 2006	◆ FCC Regulations – Class B statement
		◆ Modified: section 1.3.9 Reader – Symbologies Supported & Enabled
1.03	May 23, 2006	Company name changed to CIPHERLAB CO., LTD. since April 2006
		◆ New: Safety Precaution
		◆ Modified: Care & Maintenance
		◆ Modified: section 1.2.3 Dimensions & Specifications
		◆ Modified: section 1.3.4 Keypad – Screen Icons
		◆ Modified: section 1.3.5 LCD – Screen & Backlight Settings
		◆ Modified: section 1.3.12 Application Software to include AG and CipherNet
		◆ Modified: sections 2, 2.5 ~ 2.7
		◆ Modified: sections 3.1 & 3.3
		◆ Modified: section 4.1.2 Screen Calibration
		◆ Modified: section 4.1.6 Load Program via Bluetooth
1.02	Apr. 4, 2006	◆ Update drawings
		◆ Load Program via Bluetooth
1.00	Mar. 1, 2006	Official release

C H A P T E R   1

Introduction

This chapter mainly explains the hardware parts and features of the 8500 Series Mobile Computer.

The 8500 family includes:

- 8500   Bluetooth Class 2
- 8570   Bluetooth Class 2 + 802.11b/g
- 8580   Bluetooth Class 2 + GSM/GPRS
- 8590   Bluetooth Class 2 + 802.11b/g + GSM/GPRS

In This Chapter

1.1 Inside the Package

The following items are included in the package. Save the box and packaging material for future use in case you need to store or ship the mobile computer.

- 8500 Series Mobile Computer
- Rechargeable Li-ion battery pack
- Stylus
- Hand strap
- Software & Manual CD

Note: For battery charging, you will need to purchase a charging cradle separately.

1.2 Options

Rich choices of optional accessories are available for you to enhance the total performance of the mobile computer.

- Pistol Grip (detachable)
- Belt Holster
- Protective Cover
- Memory Card, 4 or 8 MB
- Spare rechargeable Li-ion battery
- 4-slot Battery Charger
- Charging & Communication Cradle
- Modem Cradle
- Ethernet Cradle
- Bluetooth Access Point
- 802.11b/g Access Point

1.3 Product Highlights

- Ergonomic design - ruggedized yet streamlined, with hand strap for secure hold.
- Built tough to survive harsh environments - splash, dust & drop resistant.
- Upgradeable memory - optional memory card adds up to 10 MB for data storage.
- Dual mode support - 1D / 2D scan engine plus RFID reader.
- Total wireless solution - connectivity includes IR / IrDA, Bluetooth, 802.11b/g and GSM/GPRS.
- Large graphic monochrome LCD touch screen supports double-byte characters and bitmap graphics. The touch screen featuring signature capture can be activated with its stylus or a finger, software programmable.
- Programmable feedback includes buzzer, LED indicator, and vibrator.
- Quick link to any backend database through Windows-based CipherNet programs for VT100/220 and IBM 5250 emulation.
- Easy customization of AG applications through Windows-based Application Generator (AG) programs for preloaded AG Runtime.
- Programming support includes BASIC & C compilers.

1.4 Overview

1.4.1 Nomenclature

LCD
(also a touch screen)

Stylus

LED Status Light

ENTER keys

SCAN button

POWER key

Contacts for charging

IrDA Port

Pistol Grip, optional
to be screwed
after removal of this cover

Hand Strap
to be screwed (up)
and hooked (down)

Battery Latch

Li-ion Battery
fit to compartment
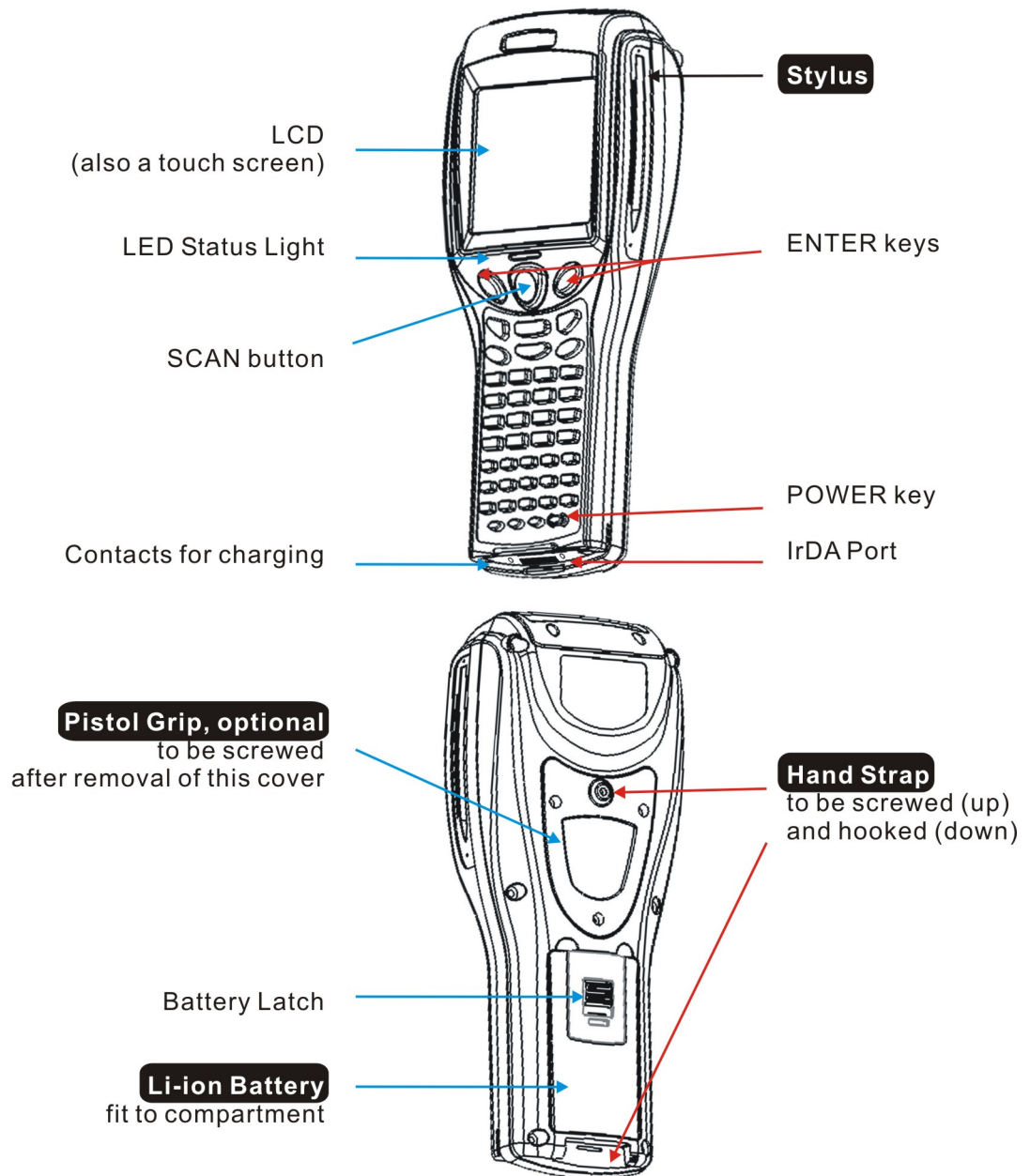
Figure 1: Nomenclature (front & back)

1.4.2 Accessories & Peripherals

Scanning Window

SCAN Trigger

Pistol Grip, optional

Terminal Seat

Spare Battery Compartment

Cradle, optional
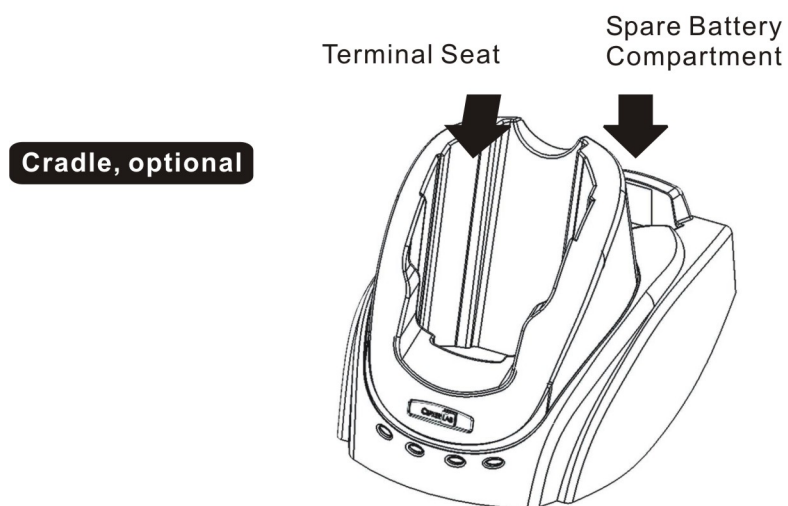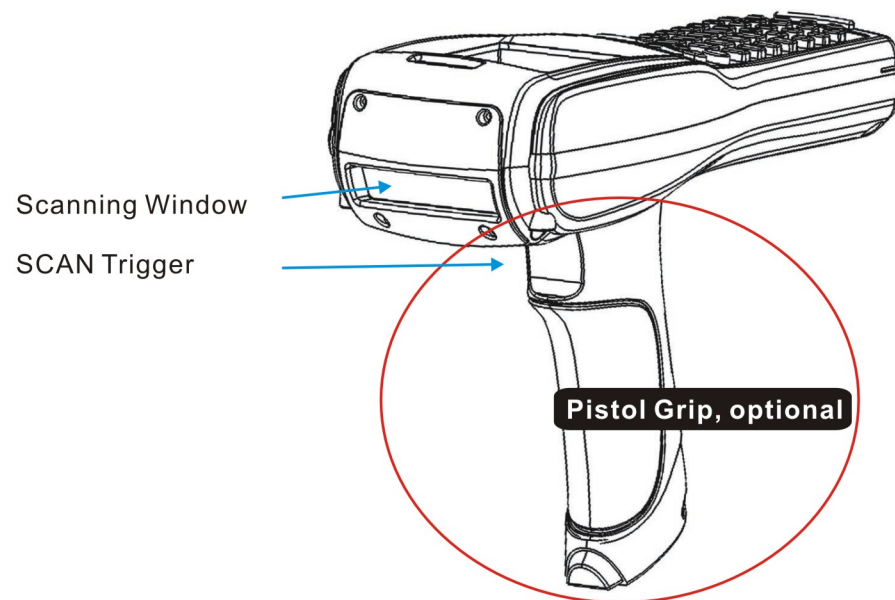
Figure 2: Nomenclature of accessories

1.4.3 Dimensions

91 mm

65 mm

230 mm

66 mm

40 mm
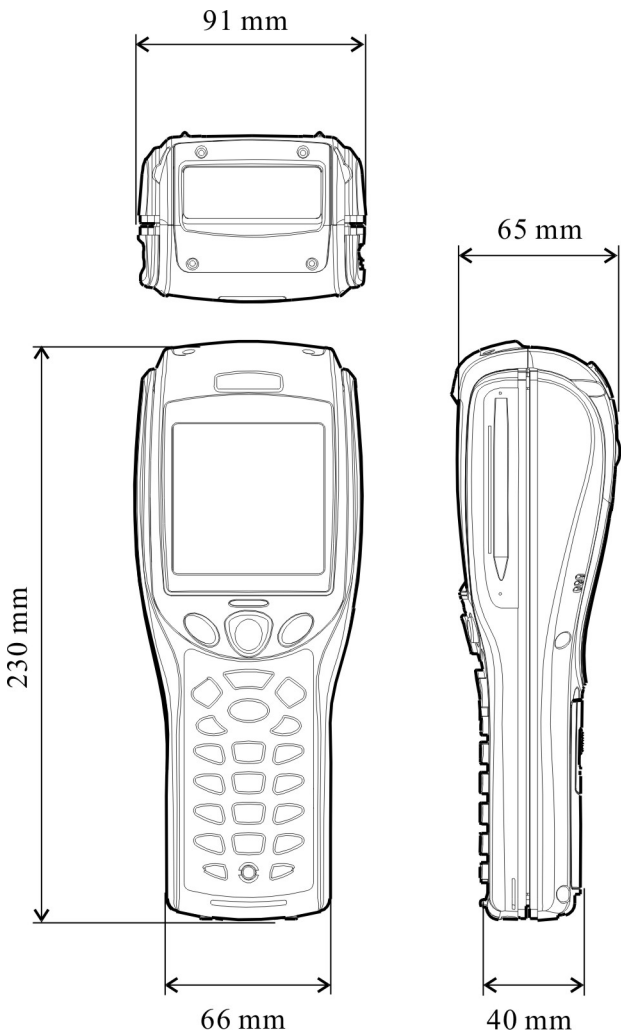
Figure 3: Dimensions

1.5 Features

1.5.1 Power

Main Battery

The 8500 Series is powered by a rechargeable 3.7 V/4000 mAh Li-ion battery pack, and it takes approximately four hours to fully charge it.

For power-saving purpose, always turn off the backlight while working in a well-lit area. When the backlight is on for extended periods of time, the main battery will become low sooner than expected.

The smart battery icon on the LCD screen shows the status of power consumption. There are two ways to monitor a low battery charge or discharged battery from the screen.

- Examine the level of the 4-bar battery icon
- Monitor voltage level (see section 4.1.5 Power)

Backup Battery

In addition, one 3.0 V/7 mAh rechargeable Lithium button cell on the main board retains data in SRAM and maintains the running of the real-time clock and calendar. It takes at least twenty-four hours to fully charge the backup battery.

For a fully charged backup battery, it can last for at least one week. However, it is not necessary to fully charge the backup battery for the mobile computer to work.

- Monitor voltage level (see section 4.1.5 Power)

Initial Charging

The main battery must be fully charged before using the mobile computer for the first time. Because the internal backup battery is constantly charged from the main battery, the initial charging requires installing the battery pack to the mobile computer and then seating the mobile computer in the cradle for charging. This will have both the main and backup batteries charged at the same time.

Note: For initial charging, it takes approximately 4 hours to fully charge the main battery.

Caution of Low Battery Charge

The battery pack is the only power source for the mobile computer to work. It also charges the backup battery on the main board so that the data stored in SRAM can be retained properly. Therefore, when the main battery charge goes low, replace the battery pack with a charged one or charge it as soon as possible. And, always save data before it is too late.

Warning: Data loss may occur with SRAM during low battery condition. Always save data before running out of power or keep a fresh battery for replacement.

1.5.2 CPU

A 16-bit CMOS type CPU is utilized, low power consumption.

1.5.3 Memory

The collected data can be sent back to a host computer immediately or stored in memory (SRAM).

Program Memory

- ◆ 2 megabytes flash memory for core, OS, application programs, fonts, etc.

Data Memory

- ◆ 2 megabytes SRAM with contents backup by a 7 mAh rechargeable Lithium button cell.
- ◆ An optional memory card provides additional 4 or 8 megabytes.

Calendar

- ◆ A calendar chip is equipped for accurate time/date logging.

Caution of Data Loss

When the main battery is removed or drained, the backup battery on the main board is to retain the contents of SRAM and maintain the running of the calendar for at least one week, on condition that the backup battery has already been fully charged.

If you want to put away the mobile computer for a couple of days, you should be aware that data loss occurs when both the main and backup batteries discharge completely. Therefore, it is necessary to save data in a host computer before putting away the mobile computer!

1.5.4 Keypad

The mobile computer can be equipped with a keypad of 24 keys or 44 keys for system setup, user entry and so on. The keypad comes with programmable LED backlight, like the screen. Refer to section 1.5.5 LCD for screen & backlight settings.

Silicon rubber has been chosen for their durability and prompt feedback. The key click can be configured through programming or the **System Menu**.

Screen Icons

When any of the following icons appears on the screen, it indicates a certain mode is activated. It means holding down the specific key is unnecessary. Simply press another key or red-coded function key ([F1] ~ [F12]) to produce a result.

24-key

- A / a: Press [Alpha] to enter the alphabetic mode, capital or small letters.
- F: Press [FN] to enter the function mode.*

44-key

- ↑:   Press [Shift] to enter the special function mode.*

             By default, it is the toggle of capital/small letters.
- F: Press [RED] to enter the function mode.*
- A: Press [Alt] to enter the special function mode.*

Note: When pressing these (special) function keys, the system will send the associated key codes to the application program, and it is up to the application program to interpret the key codes.

24-key layout

The layout of the 24-key keypad is similar to that of a telephone, which consists of an alphanumeric keypad and assorted characters.

- This keypad is set to numeric mode by default.
- For alpha mode, simply press [ALPHA] to toggle between alpha and numeric modes.

Blue Area

(Navigation keys)

Black Area

(Numeric)

Yellow Area
(Alphabetic)

Alpha key   Power key   *FN key*
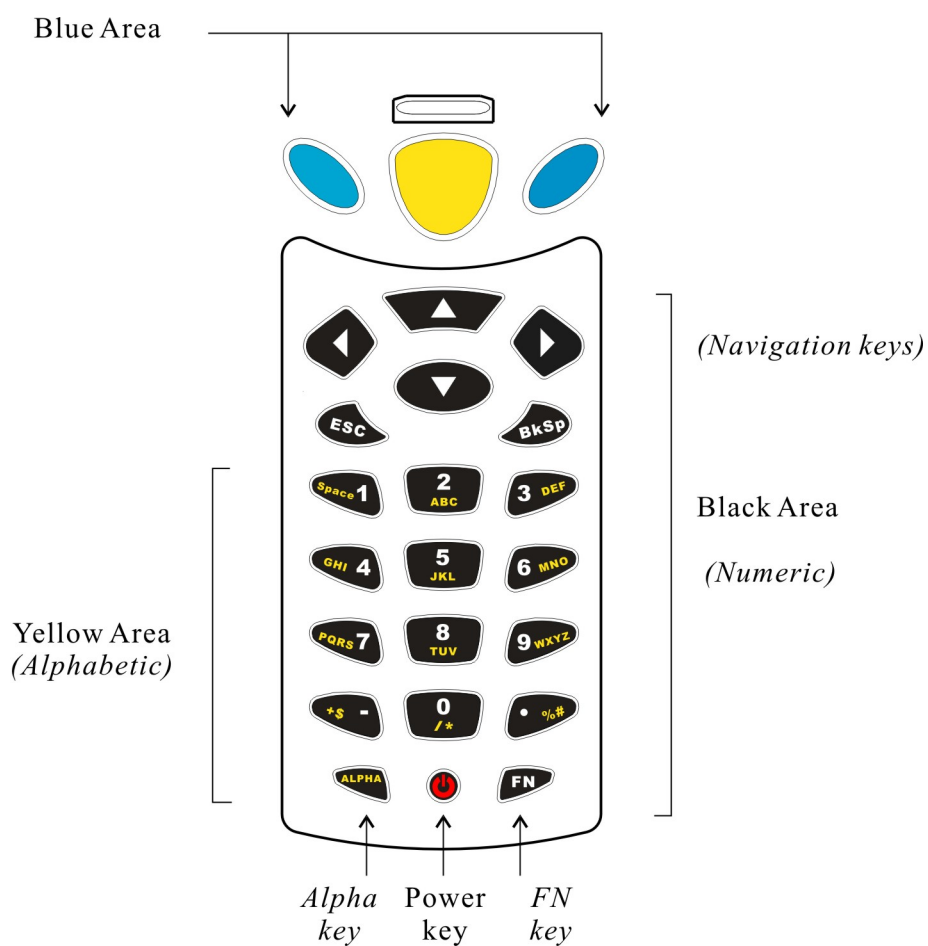
Figure 4: 24-key layout

44-key layout

The layout of the 44-key keypad includes numeric, alphabetic, assorted characters, function and modifier keys.
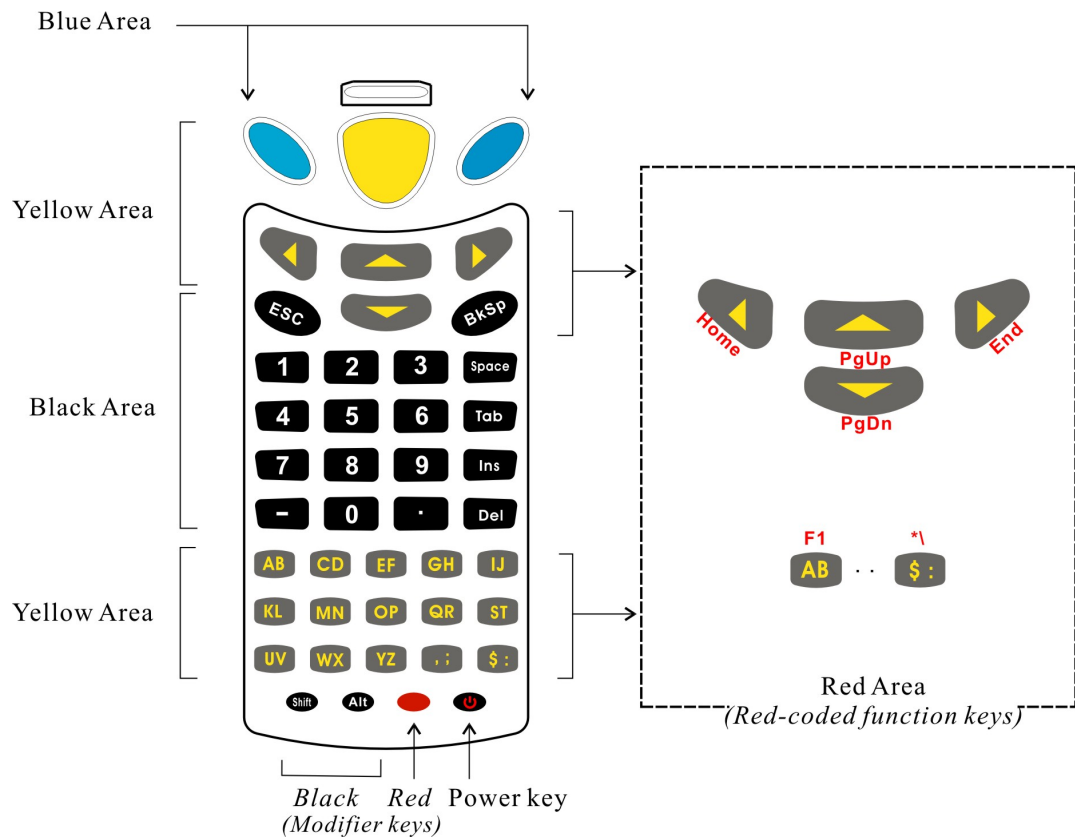
Figure 5: 44-key layout

For the 44-key keypad, these keys can be categorized into the following groups by color:

Blue Area:

◆   Two [Enter] keys: user-friendly and convenient for either right-handed or left-handed operator to perform general function of a [Enter] key.

◆   It can be used together with [RED] modifier key: [Enter] + [RED] = alternately turn ON/OFF the backlight of LCD and keypad.

Black Area:

◆   Power key

◆   Numeric keys

◆   Modifier keys: [Shift] or [Alt] that modifies its next key. The functionality depends on software application.

◆   Others like [Backspace], [ESC], [Space], [Tab], [Insert], [Delete], [-], [.]

Yellow Area:

◆   [Scan] button

◆   Navigation keys for moving the cursor up, down, left, right.

◆   Alphabetic keys

◆   Others like punctuation keys for comma & semi-colon, dollar & colon.

Red Area:

◆   [RED] modifier key: the solid red key next to the Power key

◆   [RED] followed by one red-coded key: The [RED] modifier key modifies (activates) the second key. Its functionality is determined by the red-coded key, which is specified by red letters under the navigation keys or on top of alpha keys and some punctuation keys.

1.5.5 LCD

The mobile computer comes with a 3" FSTN graphic LCD, 160 by 160 pixels resolutions, which can be programmed to display text or graphics, such as specific font and company logo, to meet varying application needs.

Options	Font Size (pixels)	Characters by lines
English font	Font size 6×8 (pixels)	26 characters by 19 lines
	Font size 8×16 (pixels)	20 characters by 9 lines
Chinese font	Font size 16×16 (pixels)	10 characters by 9 lines
Other language fonts, company logo…	Programmable	

Note: Normally, the bottom line (ICON_ZONE) is reserved to display status icons, such as the battery icon.

Screen & Backlight Settings

The backlight of screen and keypad helps ease reading under dim environments. Relevant settings can be configured or adjusted by pressing the following key combinations (you may press and hold the function key, and then, press the second key):

Settings	22-key	44-key
Backlight ON/OFF	[FN] + [Enter]	[RED] + [Enter]
Backlight Intensity	[FN] + [Left] or [FN] + [Right]	[RED] + [Left] or [RED] + [Right]
LCD Contrast	[FN] + [Up] or [FN] + [Down]	[RED] + [Up] or [RED] + [Down]

Touch Screen & Signature Capture

This LCD is also a touch screen, which enables the use of a stylus for handwriting. It also features signature capture that can save signature as confirmation of receipt when delivering goods to door.

Refer to section 4.1.2 Settings for screen & contrast calibration.

Warning: DO NOT use any pointed or sharp objects to move against the surface of the screen.

1.5.6 Status LED

The dual-color LED above the [Scan] trigger can be programmed to provide information that helps diagnosing.

For example, if you are using **AG Runtime**, you will be informed of the scanning result immediately by this LED indicator:

- Red LED   - Error
- Green LED - Good Read

1.5.7 Buzzer

The buzzer is a low power transducer type and can be programmed for status feedback. Its pitch and duration are software programmable.

1.5.8 Vibrator

The mobile computer is integrated with a vibrator. It is software programmable and especially useful when working in a noisy environment.

1.5.9 Reader

A wide variety of scan engines is available for delivering flexibility to meet different requirements.

Types of Reader	Scan Engine
1D Barcode Reader	◆ CCD (Long Range Imager) ◆ Laser scan engine ◆ Long Range Laser scan engine ◆ Extra Long Range Laser scan engine (with aiming beam)
2D Barcode Reader	2D scan engine
RFID	Tags supported include:

Standard	Labels
ISO 14443A	◆ Mifare Standard 1K ◆ Mifare Standard 4K ◆ Mifare Ultralight ◆ Mifare DESFire ◆ Mifare S50 ◆ SLE44R35 ◆ SLE66R35
ISO 14443B	◆ SRIX 4K
ISO 15693	◆ ICODE SLI ◆ SRF55V02P ◆ SRF55V02S ◆ SRF55V10P ◆ TI Tag-it HF-I
ICODE® (Phillips)	◆ ICODE

Dual Mode Support

The mobile computer allows the co-existence of one integrated scan engine and the RFID reader.

Symbologies Supported & Enabled

The supported symbologies depend on the scan engine you use; some of the supported symbologies must be enabled through programming if not enabled by default.

CCD / Laser scan engine		
Symbologies	**(Also Known As)**	**Enabled by default**
Codabar	(NW7)	Yes
Industrial 25		Yes
Interleaved 25		Yes
Matrix 25		No
Code 39		Yes
Italian Pharmacode		No
CIP 39	(French Pharmacode)	No
Code 93		Yes
Code 128		Yes
EAN-128		Yes
MSI		No
Plessey		No
RSS-14		No
Telepen		No
EAN-8		Yes
EAN-8 with Addon 2, Addon 5		Yes
EAN-13		Yes
EAN-13 with Addon 2, Addon 5		Yes
GTIN		No
UPC-A		Yes
UPC-A with Addon 2, Addon 5		Yes
UPC-E0/UPC-E1		Yes
UPC-E0/UPC-E1 with Addon 2, Addon 5		Yes

Long Range Laser scan engine	
Symbologies:	**Enabled by default**
Codabar (NW7)	Yes
Interleaved 25	Yes
Discrete 25 (Industrial 25)	Yes
IATA (25) (Variant of Code 25)	Yes
Code 39	Yes
Code 39 Full ASCII	Yes
Trioptic (Variant of Code 39)	Yes
Code 93	Yes
Code 128	Yes
ISBT 128	Yes
EAN-128	Yes
MSI	Yes
RSS-14	Yes
RSS Limited	Yes
RSS Expanded	Yes
UPC-E (UPC-E0)	Yes
UPC-E with Addon 2, Addon 5 (UPC-E0)	Yes
EAN-8	Yes
EAN-8 with Addon 2, Addon 5	Yes
EAN-13	Yes
EAN-13 with Addon 2, Addon 5	Yes
Bookland (EAN)	Yes
UPC-A	Yes
UPC-A with Addon 2, Addon 5	Yes
UPC-E1	Yes
UPC-E1 with Addon 2, Addon 5	Yes

1.5.10 Wireless Support

The 8500 Series supports state-of-the-art wireless technologies so that it can send / receive data in real time in an efficient way.

- WPAN: Infrared (IR / IrDA) technology for data exchange, embedded
- WPAN: Bluetooth technology for cable replacement & data exchange, embedded
- WLAN: IEEE 802.11b/g for wireless networking, optional
- WWAN: GSM/GPRS for short message service, optional

Generally, the coverage of each technology can be viewed as follows.
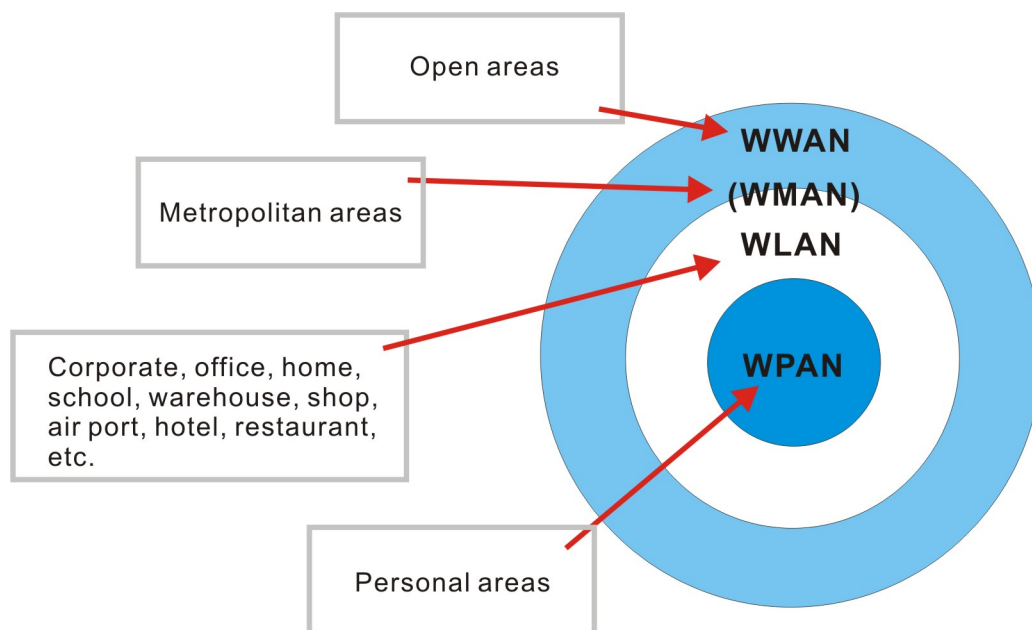
Figure 6: Coverage of wireless technologies

IR / IrDA

The mobile computer has an integrated IR port on the bottom, which can directly establish connection with an IR device for printing or data exchange. Simply have the IR port of the mobile computer toward the IR port of the target device.

- This IR port supports CipherLab proprietary IR communication protocol and standard IrDA protocol.
- IrDA specification defines communications (transmit/receive data) between two IrDA enabled devices within a short range, line-of-sight.

IR / IrDA Specifications	
Infra Red:	Optical
Data Rate:	Up to 115200 bps
Connected devices:	Peer-to-Peer
Coverage:	From contact to 30 cm, line-of-sight
Standard:	CipherLab proprietary protocol and IrDA 1.0

Bluetooth Class 2

Bluetooth technology is for cable replacement & data exchange. With built-in Bluetooth module, the 8500 Series can directly communicate with any Bluetooth enabled device, not necessarily line-of-sight.

- Serial Port Profile (SPP) is for ad-hoc networking, without going through any access point.
- Dial-Up Networking Profile (DUN) makes use of a Bluetooth modem or mobile phone as a wireless modem.

   Also, it can be used to activate the GPRS functionality on a mobile phone.

- Human Interface Device Profile (HID) allows a terminal to work as an input device, i.e. keyboard, for a host computer.
- Personal Area Networking Profile (PAN) makes use of Bluetooth Network Encapsulation Protocol (BNEP) for IP networking over Bluetooth. Access points (AP) are required.

Bluetooth Specification	
Frequency Range:	2.4 GHz
Data Rate:	433 kbps
Connected Devices:	1 for DUN mode
	Up to 7 for SPP or PAN mode (AP required)
Profiles:	SPP, DUN, PAN
Coverage:	Class 2 – 10 meters line-of-sight
Max. Output Power:	Class 2 – 6 mW
Spread Spectrum:	FHSS
Modulation:	GFSK
Standard:	Bluetooth version 1.1

IEEE 802.11b/g

Model 8570/8590 can easily connect to legacy networks through access points (APs). Roaming among different networks is possible.

IEEE 802.11b/g is an industrial standard for Wireless Local Area Networking (WLAN), which enables wireless communications over a long distance.

The speed of connection between two wireless devices will vary with range and signal quality. To maintain a reliable connection, the data rate of the 802.11b/g system will automatically fallback as range increases or signal quality decreases.

802.11b/g Specification	
Frequency Range:	2.4 GHz
Data Rate:	802.11b – 1, 2, 5.5, 11 Mbps
	802.11g – 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Connected Devices:	1 for ad-hoc mode (No AP)
	Multiple for infrastructure mode (AP required)
Profiles:	IP/TCP/UDP
Coverage:	350 meters line-of-sight
Max. Output Power:	50 mW (802.11b)
Spread Spectrum:	DSSS
Modulation:	802.11b – DBPSK (1 Mbps), DQPSK (2 Mbps), CCK (5.5 & 11 Mbps)
	802.11g – OFDM
Standard:	IEEE 802.11b/g, interoperable with Wi-Fi devices

GSM/GPRS

Model 8580/8590 is capable of data communications over free air, right on the road.

- GSM and GPRS are industrial standards for Wireless Wide Area Networking (WWAN), which enables wireless communications over free air.
- "GSM" is an abbreviation of Global System for Mobile Communications.
- "GPRS" is an abbreviation of General Packet Radio Service.
- GPRS, a packet-switched technology based on GSM (circuit-switched), allowing information to be transmitted or received more quickly, immediately and efficiently across the mobile network. GPRS Class B mobile devices can be attached to both GSM and GPRS services, using one service at a time.

1.5.11 Resistance

Impact

The mobile computer is designed for harsh industrial environments, and is proved to survive drop test by the following criteria:

Surface Type	Distance to Surface	Drop Times
Concrete	1.5 meters	5 drops per 6 sides

Splash & Dust

The mobile computer is sealed against moisture and dust to industry standard IP 64.

- 6 = Totally protected against dust
- 4 = Protection against water sprayed from all directions, i.e. limited ingress is permitted.

1.5.12 Application Software

Application Generator (AG)

For easy development of applications, the mobile computer ships with development tools on the CD-ROM. It includes Windows-based **Application Generator** programs, batch and WLAN, as well as relevant utilities.

Terminal Emulation

The mobile computer supports VT100/220 and IBM 5250 terminal emulation for accessing a backend database. The Windows-based **CipherNet** programs are available on the CD-ROM.

1.5.13 Programming Support

For developing custom applications, CipherLab provides BASIC and C compliers through licensing.

C H A P T E R 2

Installation

The mobile computer is designed for portable use, and it almost requires no installation except installing the battery pack and necessary auxiliary parts.

Warning: Read Important Safety Precautions before installation.

In This Chapter

2.1 Installing the Battery Pack

Always prepare a spare battery pack, especially when you are on the road. To save power, turn off the backlight when you are working in a bright work area.

1. Place the mobile computer face down on a flat and clean surface.

2. Slide the battery pack into the battery compartment at a proper angle (30°~45°) so that the tabs on the bottom of the battery are hooked in the grooves of the compartment. Make sure that the battery is snugly fit into the compartment.

3. Hold the mobile computer still and slide the battery latch to lock the battery in the compartment.

Note: For a new battery, make sure it is fully charged before use.
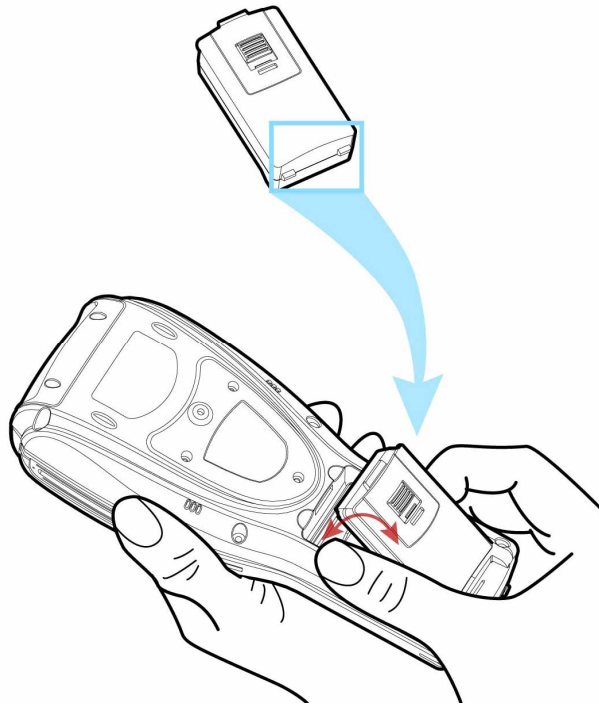
Figure 7: Installing battery pack

2.2 Installing the Hand Strap

The hand strap is ideal for one-handed operation, which requires safe and convenient hold of the mobile computer. Always make sure the hand strap is well hooked and screwed to the back of the mobile computer.

When a hand strap is necessary, install it to the mobile computer by following these steps:

1. Place the mobile computer face down on a flat and clean surface.

2. Screw one end of the hand strap to the shield-like cover on the back of the mobile computer.

3. Insert and hook the other end of the hand strap to the bottom of the mobile computer.

4. Make sure the hand strap is securely attached to the mobile computer.

5. Adjust the length of the hand strap to suit your handbreadth.
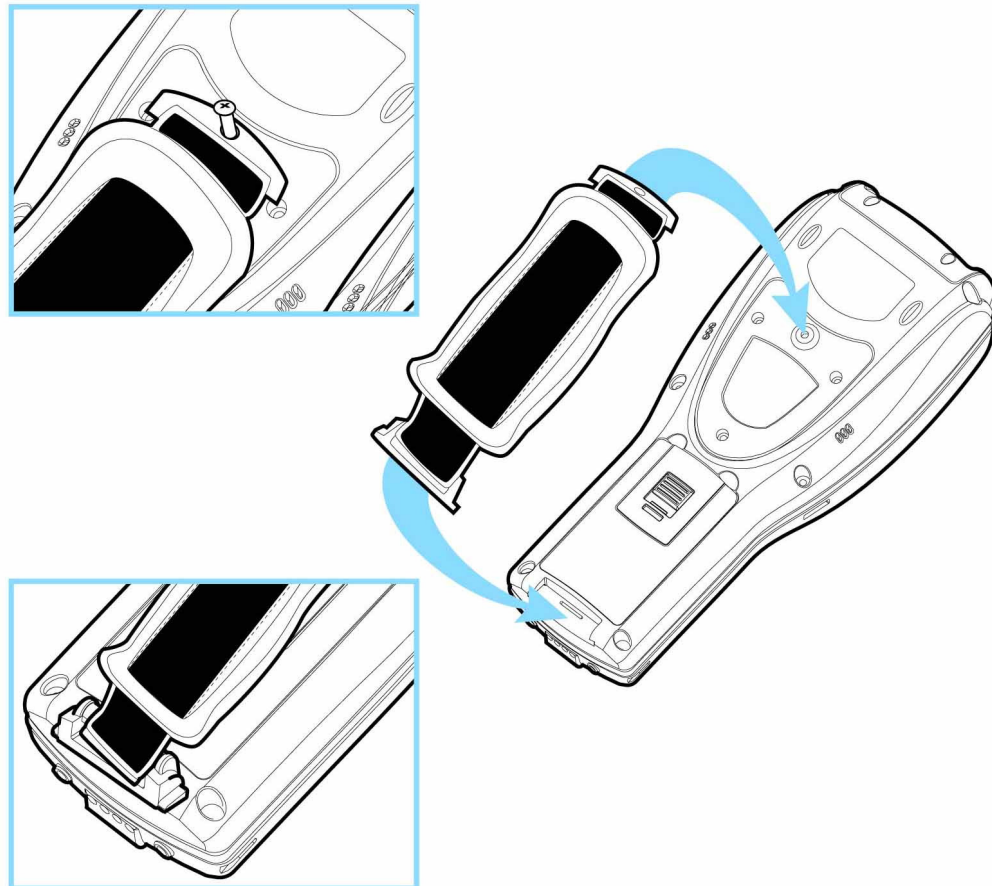
Figure 8: Installing hand strap

2.3 Installing the Pistol Grip

This contoured pistol grip enables intuitive trigger-and-scan operation, which is very helpful in scan intensive applications.

When a pistol grip is necessary, install it to the mobile computer by following these steps:

6. Place the mobile computer face down on a flat and clean surface.

7. Remove the shield-like cover on the back of the mobile computer by unscrewing.

   If there is a hand strap installed, remove it first. Keep the cover and screws for future use when the pistol grip is not desired.

8. Connect the power connector from the pistol grip to the receptacle on the mobile computer.

9. Screw the pistol grip to the shield-like cover.

10. Make sure all screws are tightened up.

11. Turn on the mobile computer and test the trigger.
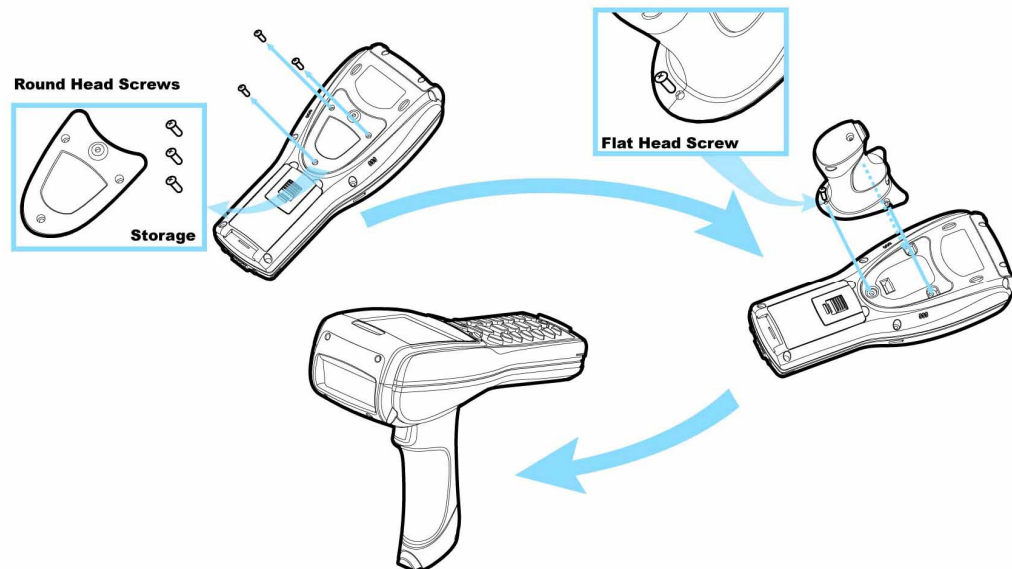
Figure 9: Installing pistol grip

2.4 Installing SIM Card for GSM/GPRS Network

When GSM/GPRS networking is required, insert the SIM card by following these steps:

1. Unscrew the four screws of the top enclosure on the mobile computer.
2. Take out the GSM/GPRS card from the mobile computer.
3. Insert your SIM card on the GSM/GPRS card.
4. Put the GSM/GPRS card back to the mobile computer.
5. Screw the top enclosure tightly.
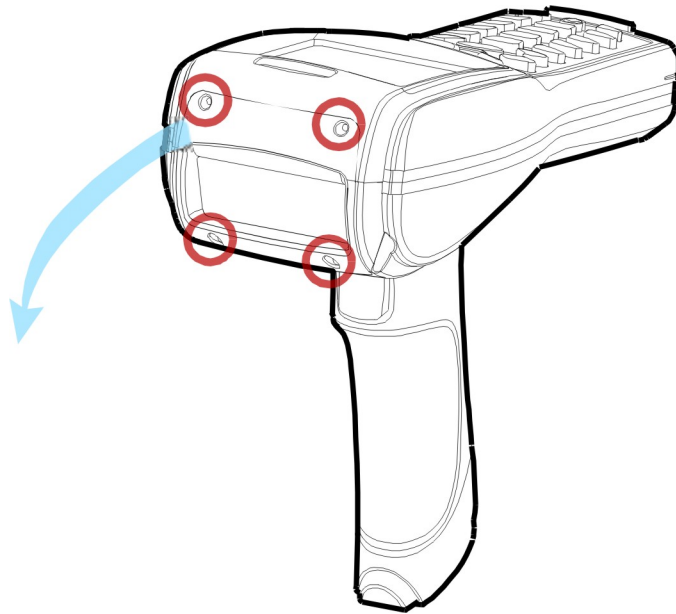
Figure 10: Inserting SIM card

2.5 Setting up the Cradle

You may choose an appropriate cradle that best suits your needs.

1. Place the cradle on a flat and clean surface.

2. Connect the line of the power adaptor to the power jack on the back of the cradle.

3. Connect the power adaptor to a suitable power outlet.

4. The cradle is ready for charging.

5. Seat the mobile computer in the cradle.

   If data communications are desired at the same time, you can establish a proper connection with a computer or remote host. Refer to the Installation Guide of your cradle.
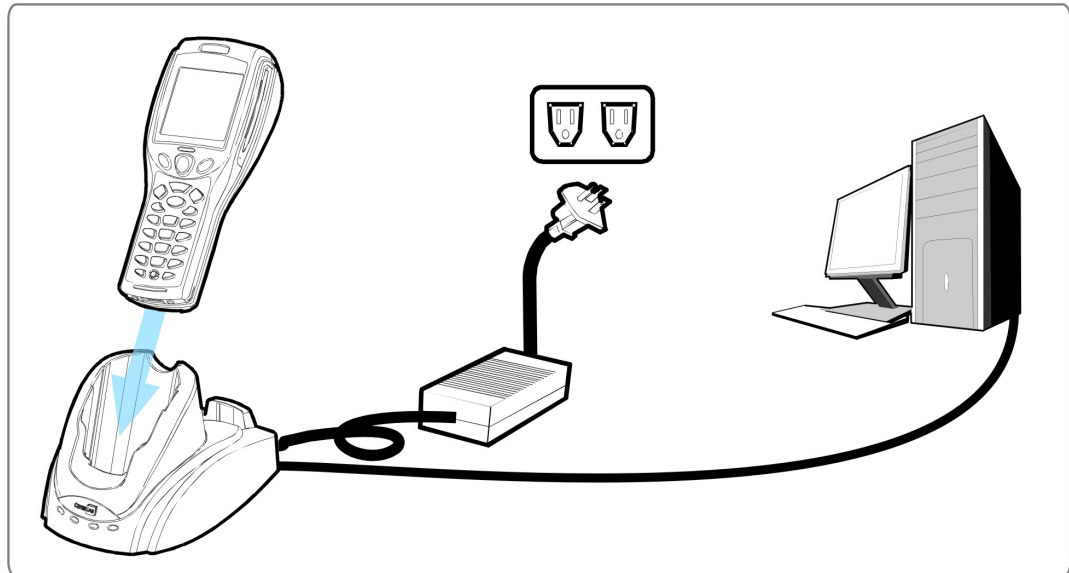
Figure 11: Setting up cradle

2.5.1 Cradle Options

The following cradle types are available on order:

Cradle Type	Serial Cradle	Modem Cradle	Ethernet Cradle
POWER Jack	√	√	√
RS-232 Port	√	√	√

Line Jack	−	√	−
Phone Jack	−	√	−
RJ-45 Port	−	−	√
DIP Switch	−	√ (RS-232/Modem)	√ (Auto/LAN)
IP Reset Switch	−	−	√

Delivering flexibility in making a connection, the Modem Cradle integrates the modem functionality (56 kbps) on the Serial Cradle. You may choose to use the modem or RS-232 port by sliding the DIP switch.

Note: Refer to the Ethernet Cradle manual for more information.

2.5.2 Front Panel

For charging status of the loaded battery in the mobile computer, view the device screen.
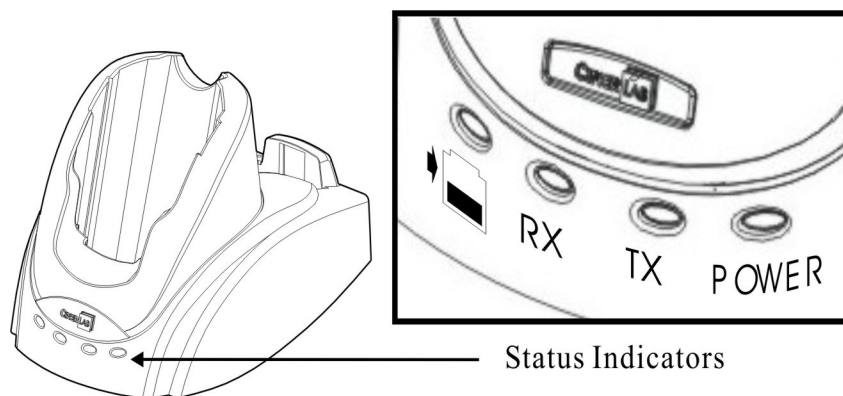
Status Indicators

Figure 12: Cradle LEDs

Front Panel LEDs	Tasks	Indication of connection status	
▮ :	Spare battery charging status	Solid red	Charging
		Solid green	Charging done
		Flashing (red/green)	Error occurs
		Off	Battery not ready
RX:	Receiving status	Solid red	Receiving data from Ethernet or host
		Off	No activity

TX:	Transmitting status	Solid red	Transmitting data to Ethernet or host
		Off	No activity
POWER:	Line status	Solid red	Modem/Ethernet connection
		Solid green	Direct connection via RS-232
		Off	Power off

Warning: Charging error may occur due to a power failure or defected battery contacts.

2.5.3 Back Panel
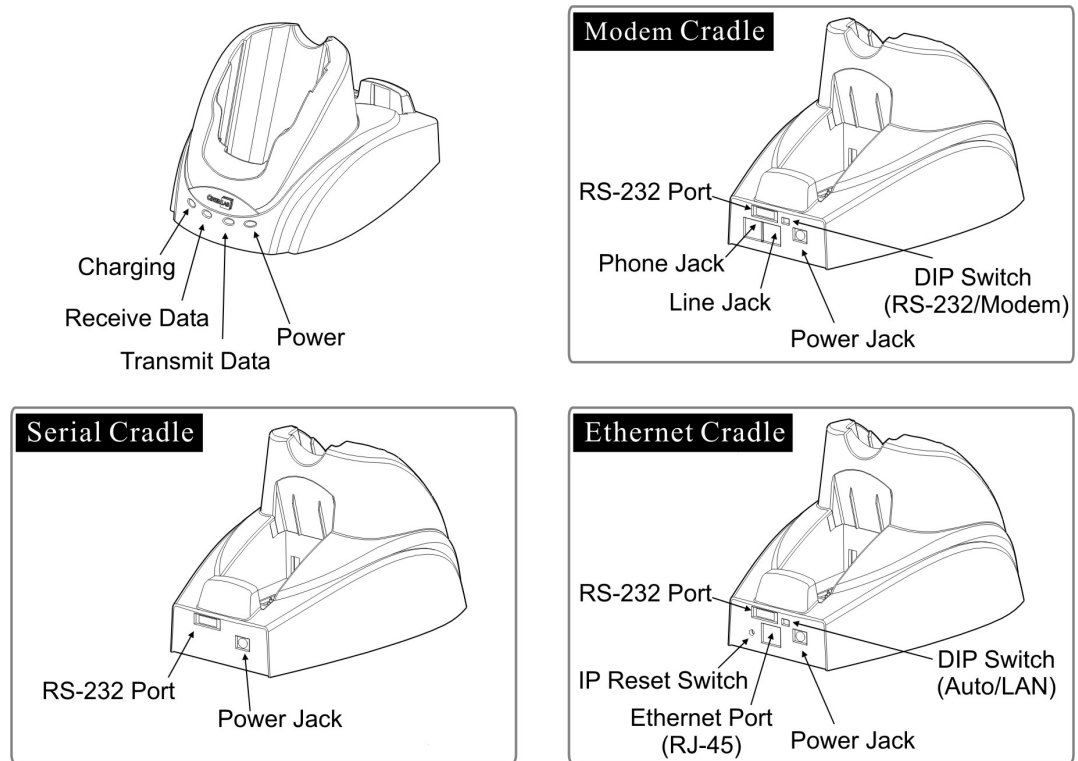
Figure 13: Cradles –Back panel

Modem Cradle: DIP Switch

Modem Connection

- To use the modem functionality, slide the DIP switch to right: Modem
- When the power cable is properly connected, the LED light of POWER on the front panel will be solid red.

RS-232 Connection

- To use the RS-232 port, slide the DIP switch to left: RS-232
- When the power cable is properly connected, the LED light of POWER on the front panel will be solid green.

Ethernet Cradle: DIP Switch

Auto-detect Connection

Slide the DIP switch to left: Auto

- The RS-232 connection will override Ethernet connection when both are present. However, you can use cradle commands to switch in between the two.
- When the power cable is properly connected, the LED light of POWER on the front panel will be solid green.

LAN Connection

Slide the DIP switch to right: LAN

- Only the Ethernet connection can be established. However, you can use cradle commands to switch in between the two.
- When the power cable is properly connected, the LED light of POWER on the front panel will be solid red.

2.6 Battery Charger

If you have purchased the 4-slot battery charger, you can charge up to four batteries at the same time. This is particularly convenient for a non-stop operation or locations where a proper power supply is unavailable.

Note: It takes approximately 4 hours to fully charge the battery pack.

C H A P T E R 3

Software Architecture

In This Chapter

3.1 Overview

The software inside the mobile computer consists of three modules: Kernel, System, and Application Program.
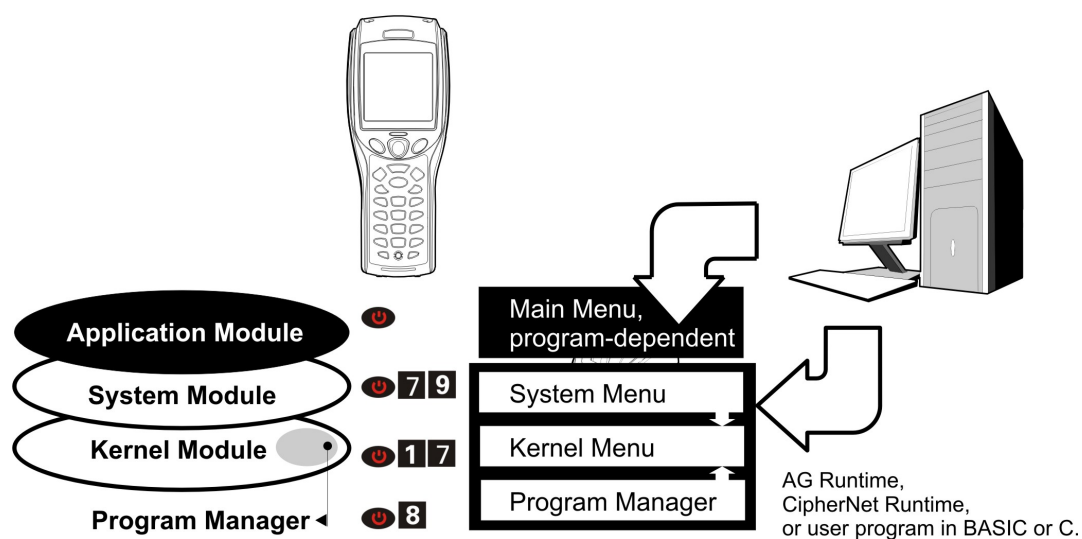
Figure 14: Software Architecture

3.2 System Configuration

For managing system configurations and multiple programs, each mobile computer comes with the **System Menu**, **Kernel**, and **Program Manager**.

System Menu

The **System Menu** is bundled with BASIC Runtime or user programs that are written in "C". It is for system configuration, functionality testing, downloading font file and program.

Kernel

Kernel is the innermost core of the OS. It provides services for downloading the active application program or font file, updating the kernel or the active application program, and configuring Bluetooth settings.

Program Manager

The **Program Manager** is part of the kernel. You may download as many as seven application programs, or six programs plus one font file.

3.3 Application Programs

3.3.1 Application Generator (AG)

The mobile computer is preloaded with CipherLab application program, **AG Runtime**. When you turn on the mobile computer, it displays the Main Menu of AG application.

Before using the mobile computer to collect data, you need to configure the application with the companion tool on your computer. This time-saving development tool helps create application templates on your computer. For details on the AG application, please refer to separate user manual.

Application Generator	AG Runtime	Companion Tool on PC-End
Batch AG	U8500*.SHX	AG8500.exe
RF AG	U85WLAN*.SHX	AG8500WLAN.exe

Note: The Application Generator (AG) software package includes
(1) a companion tool for quickly developing your application, i.e. AG or RF AG;
(2) several associated utilities to make it versatile in use.

3.3.2 CipherNet

Instead of **Application Generator**, you may download the terminal emulation program, i.e. **CipherNet Runtime**, to the mobile computer. Refer to section 4.1.6 Load Program. Then, run individual companion tool on your computer.

For details on the **CipherNet** application, please refer to separate user manual.

Terminal Emulation	CipherNet Runtime	Companion Tool on PC-End
VT100/220	85xx-VT.SHX	CipherNet-VT.exe
IBM 5250	85xx-5250.SHX	CipherNet-5250.exe

3.3.3 User Program

You may need to develop your own application program in BASIC or C. For detailed information, please contact CipherLab Co., Ltd.

CHAPTER 4

Configuration

This section mainly describes how to configure the 8500 Series Mobile Computer, regarding system configurations and program download.

When a menu is displayed, you may select an item by either of the following ways:

- using the [UP] and [DOWN] keys to move the highlight bar
- pressing the number key that corresponds to the item number
- using the stylus to touch that item or the item number

Item No. (Shortcut keys)

```
      System Menu          —— Menu Title
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
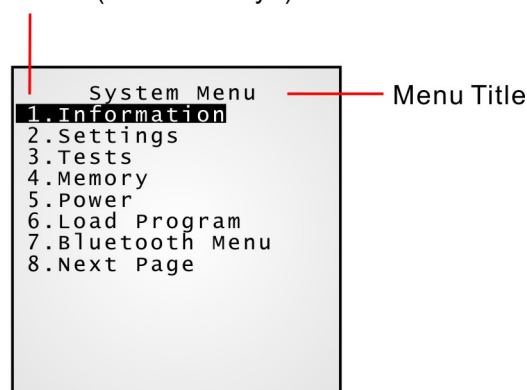
On each screen, the bottom line displays status icons, such as:

- The 4-bar battery icon indicates the current power status.
- When a turn-page icon (⟲) is displayed, it indicates there is a previous page or menu.

  To return to a previous page or menu, you may press [ESC], touch the menu title, or follow the on-screen instructions.

In This Chapter

4.1 System Menu

The **System Menu** is generated by a powerful utility, which offers an interface for engineers (programmers or system integrator) to view system information, change the configuration parameters, download programs and run diagnostics.

This menu is designed for engineering tests and maintenance ONLY. For this reason, the **System Menu** provides password protection to prevent unauthorized users from accidentally changing system settings.

Warning! The System Menu is NOT for the use of any end users. The system password helps ensure system safety and integrity.

How to access the System Menu?

1. Turn off the mobile computer.

2. Press [7] + [9] + [Power].


```
        System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```

4.1.1 Information

Here provides important system information to help diagnose the system.

```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
H/W: 8500-5
S/N: 000079230
M/D: 2006.01.18
KNL: 8500K-2.00
LIB: 8500L-2.00
USR: Unknown
DEV: 1710 - 1
RFID:V1.0
```
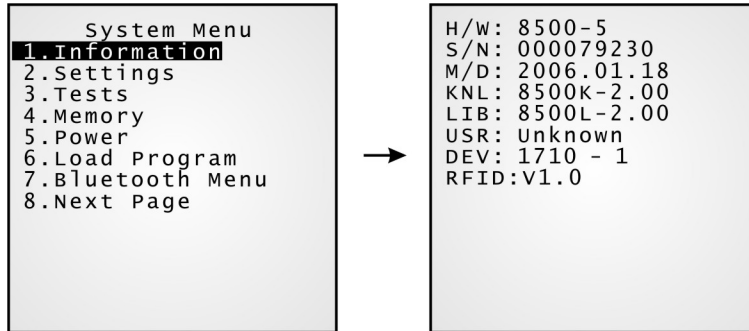
System Menu > 1. Information

H/W	Hardware version (PCB)
S/N	A serial number assigned to the mobile computer
M/D	Manufacturing date
KNL	Kernel version
LIB	C library version
BSC	BASIC Run-time version, if a BASIC application is downloaded
USR	Application program version
DEV	5-digit code for optional hardware configurations
	◆ For example, 1710-1 indicates the 44-key mobile computer is equipped with CCD scan engine, RFID reader, and 802.11b/g and GSM/GPRS connectivity.
RFID	RFID module version if present; the 3rd digit of the above Device Code must be 1

<u>Understanding Device Code</u>

Device Code	Modular Component	Types
1st digit	Reader module	0= No reader
		1= CCD scan engine
		2= Laser scan engine
		3= 2D scan engine
		4= Long Range Laser scan engine
		5= Extra Long Range Laser scan engine

2nd digit	Wireless module	3= Bluetooth + GSM/GPRS
		4= Bluetooth + 802.11b/g
		5= Bluetooth only
		7= Bluetooth + GSM/GPRS + 802.11b/g
3rd digit	RFID module	0= none
		1= RFID reader
4th digit	Reserved	0
5th digit	Keypad module	0= 24-key
		1= 44-key

4.1.2 Settings

You can change the default settings here.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
   System Settings
1.Clock
2.Backlight Period
3.Auto Off
4.Power On Options
5.Key Click
6.Sys. Password
7.Font
8.Next Page
```
→
```
   System Settings
1.Screen Calibration
2.Reset to Default
3.Reset Reader
4.LCD Heater
```
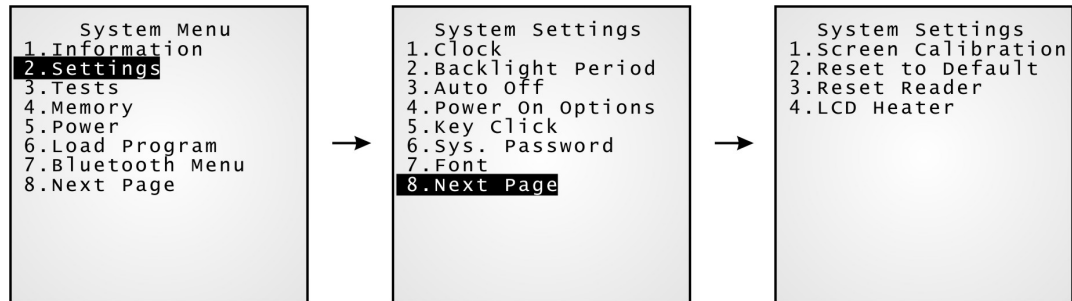
System Settings	Default Values
Clock	blank
Backlight Period	20 seconds, Level 2
Auto Off	10 minutes
Power On Options	Program Resume
Key Click	Tone 2
System Password	Open access
Font	System font
Reset to Default	Factory settings
Reset Reader	Factory settings of 2D or (Extra) Long Range Laser scan engine
LCD Heater	Disabled

Settings > Clock

Set date and time for Real Time Clock. Enter two digits for the year, i.e. 04 for 2004.

Settings > Backlight Period

Set the backlight duration for the keypad and LCD.

- Enter a value between 0 and 9999.
- Use the [UP] and [DOWN] keys to adjust the backlight level.

Settings > Auto Off

The mobile computer will be turned off automatically when no operation is taking place during a specified period of time. Enter a value between 0 and 999.

Note: To disable this function, enter 0.

Settings > Power On Options

Set the startup screen once the mobile computer is turned on:

- [0] Program Resume: Start from the last session of program before the mobile computer is turned off.
- [1] Program Restart: Fresh start from the first session of the program.

Settings > Key Click

The system will produce an audible signal when any key on the keypad is pressed.

The current value is highlighted. Select a desired tone for the buzzer or mute it.

Settings > System Password

Set a password to control user access to the **System Menu**. The password can be up to eight alphanumeric characters.

Note: The password is case-sensitive. To disable a previous password, enter blank on the "Input new password" and "Verify password" screens.

Settings > Font

Font version information can be viewed here. It displays System Font if there is no custom font file.

If a multi-language font file is downloaded, you will be able to select a font from the list.

Settings > Screen Calibration

The cross mark will appear on the four corners of the screen for alignment. Use the tip of the stylus to tap at the center of the cross mark firmly and accurately.

To start with contrast calibration, press [1]+[9] simultaneously. Refer to section 1.5.5 LCD for screen & backlight settings.

Warning: DO NOT use any pointed or sharp object to move against the screen.

Settings > Reset to Default

Reset system settings to the default values, except for the reader settings.

Settings > Reset Reader

You may reset the reader settings to the default values when one of the following scan engines is installed for use:

- 2D scan engine
- Long Range Laser scan engine
- Extra Long Range Laser scan engine

Settings > LCD Heater

Set the heater functionality. When enabled, it will start to heat when the environmental temperature falls below -10 Celsius degrees.

4.1.3 Tests

Here provides functional tests for key parts.

```
    System Menu          System Tests          System Tests
1.Information        1.Reader              1.Echo Test
2.Settings           2.Buzzer              2.RFID
3.Tests              3.LCD & LED
4.Memory             4.Keyboard
5.Power              5.Memory
6.Load Program       6.Touch Screen
7.Bluetooth Menu     7.Vibrator
8.Next Page          8.Next Page
```
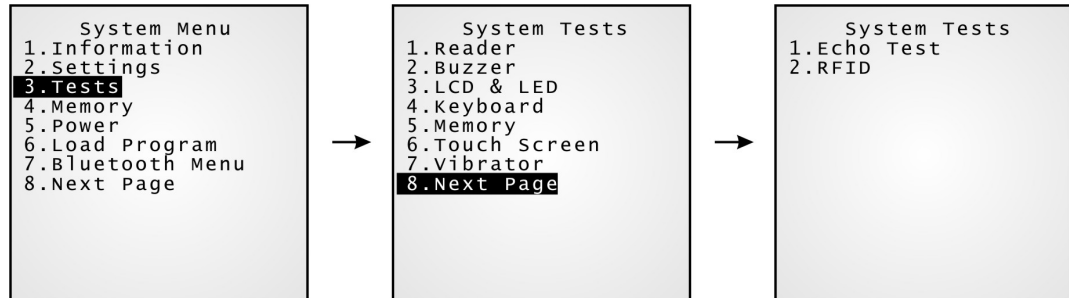
Tests > Reader

Test the reading performance of the scanner. Press [SCAN] to start. To stop and exit the test, press any key.

Note: The supported symbologies depend on the scan engine you use, and some of them are not enabled by default.

Tests > Buzzer

Test the buzzer with different frequency/duration combinations. Press [Enter] to start. To stop and exit the test, press any key.

Tests > LCD & LED

Test the LCD display and LED indicator. Press [Enter] to start. To stop and exit the test, press any key.

Tests > Keyboard

Test the rubber keys. Press any key and its corresponding character will be shown on the screen. To stop and exit the test, press [ESC].

Tests > Memory

Test the data memory (SRAM), and the results will be shown on the screen. To stop and exit the test, press [ESC].

Warning!   The contents of the data memory (SRAM) will be wiped out after test.

Tests > Touch Screen

Test signature capture by using the stylus for handwriting. Press [Enter] to start. To stop and exit the test, press [ESC].

Tests > Vibrator

Test the vibrator. To stop and exit the test, press [ESC].

Tests > Echo Test

After a physical connection is established properly, run the utility "Echo Test" on your computer and start this test on your mobile computer. Select a desired baud rate. To stop and exit the test, press [ESC].

▪ IR (Cradle-IR):

This echo test is to verify connectivity via IR between the mobile computer and any cradle.

▪ MODEM:

This echo test is to verify connectivity via modem. A telephone line must be connected to the Modem Cradle.

Note: For the Modem Cradle, any value other than 57600 bps (default) must be configured through the DIP switch on the IR control board.

Tests > RFID

Test the reading performance of the RFID reader when a proximity card is present. To stop and exit the test, press [ESC].

4.1.4 Memory

Here provides information and initialization function of the memory.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
          Memory
1.Size Information
2.Initialize
```
→
```
Base RAM   : 2048 KB
Memory Card: 8192 KB
Flash      : 2048 KB
```
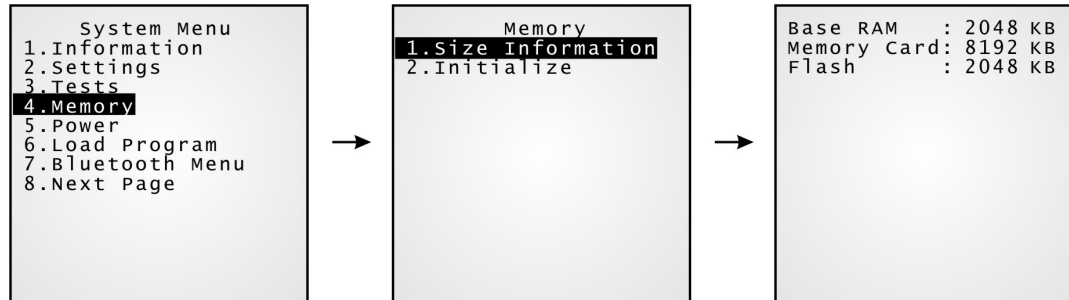
Memory > Size information

- Base RAM   (onboard SRAM for data memory)
- Memory Card   (SRAM for data memory)
- Flash   (for program memory)

Memory > Initialize

Initialize the data memory, Base RAM or Memory Card.

Warning!	The contents of the data memory (SRAM) will be wiped out after memory initialization.

4.1.5 Power

Here shows current voltage consumption.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```

→

```
   Battery Voltage
Main: 3.888V

Backup: 3.233V

```
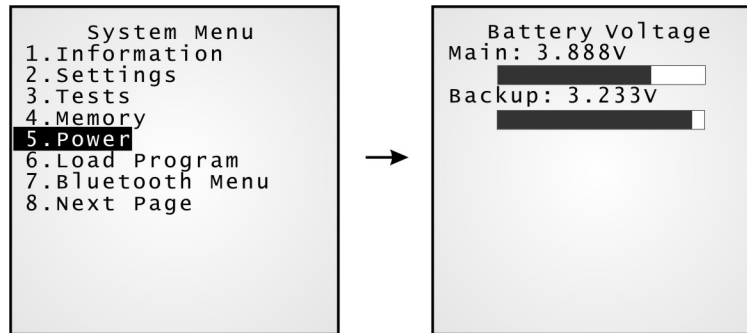
- Main (battery):

  It shows dynamic status of the battery pack, which is used as the main power source.

- Backup (battery):

  It shows dynamic status of the button cell, which is used to retain data in SRAM.

Warning!	Always examine the battery icon on the device screen so that you will be alerted for a low battery condition.

4.1.6 Load Program

Here you can access the <u>Load Program</u> service provided by the kernel which will take over the job, and therefore, you will not be able to return to the **System Menu** by pressing [ESC]. After downloading, restart the mobile computer to activate the new program.

```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
     Load Program
1.Cradle-IR
2.IrDA
3.Bluetooth
```
→
```
      Baud Rate
1.115200   5.19200
2.76800    6.9600
3.57600    7.4800
4.38400    8.2400
```

.SHX Program	Download one of the following C program files and/or one font file:
Program File	◆ AG Runtime (U*.shx)
	◆ CipherNet Runtime (85xx-5250.shx, 85xx-VT.shx)
	◆ BASIC Runtime* (BC*.shx)
	◆ User program
Font File	Refer to the Font Files folder on CD-ROM.

If you have downloaded a BASIC Runtime program, the next time you enter the Load Program submenu you will be able to select whether to download a C program (.SHX) or BASIC program (.SYN).

Note: "Load Basic" menu is only available after you have downloaded a BASIC Runtime program.

4.1.7 Bluetooth Menu

This submenu is for the built-in Bluetooth module to work with other Bluetooth enabled devices. You must configure these parameters correctly.

Bluetooth Settings	Default Value	SPP	DUN	PAN
Connect Setting		**Items Need to Be Checked**		
Local Name	Model no. + Serial no.	v	v	v
Remote Name	---	v	v	v
Broadcast Me	Enabled	v	v	v
Power Saving	Enabled	v	v	v
BT-GPRS AP Name	---	---	(v)*	---
Security				
Authentication	Disabled	v	v	v
PIN Code	---	v	v	v
Network Setting				
DHCP	Enabled	---	---	v
SubNet Mask	255.255.128.0	---	---	v
Local IP Address	0.0.0.0	---	---	v
Default Gateway	0.0.0.0	---	---	v
DNS Server	0.0.0.0	---	---	v
Domain Name	---	---	---	v

Note: GPRS AP name is ONLY required for DUN-GPRS mode.

Bluetooth Menu > Information

Information of network configuration can be viewed here.

```
     System Menu              Bluetooth Menu          LIB:8500L-2.00
1.Information            1.Information                MAC:000b6b1aa747
2.Settings              2.Connect Set                IAM:8500000079230
3.Tests                 3.Security                   CTY:Normal
4.Memory                4.Echo Tests                 DHCP:Enable
5.Power         →       5.Pairing Test      →        IP:   0.0.0.0
6.Load Program          6.Freq. Dev List             Mask:255.255.128.0
7.Bluetooth Menu        7.Network Setting            Gate:0.0.0.0
8.Next Page
```

Bluetooth Menu > 1. Information

LIB	C library version
MAC	MAC ID of the Bluetooth module
IAM	A name given to the mobile computer for identification.
	◆ By default, it is made up of model No. and the serial number. (Identical to 2. Connect Set > 1. Local Name)
CTY	◆ "Normal" means all 79 channels are available for frequency-hopping
	(There are bandwidth limitations for 2.4 GHz ISM band in some countries. For example, only 23 RF channels are defined instead of 79 RF channels in Japan, Spain and France.)
DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

Bluetooth Menu > Connect Setting

A basic Bluetooth system can be configured as (1) point to point - DUN mode, and (2) point to multi-point - SPP or PAN mode.

Set the following parameters if necessary.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    Bluetooth Menu
1.Information
2.Connect Set
3.Security
4.Echo Tests
5.Pairing Test
6.Freq. Dev List
7.Network Setting
```
→
```
   Connect Setting
1.Local Name
2.Remote Name
3.Broadcast Me
4.Power Saving
5.BT-GPRS AP Name
```
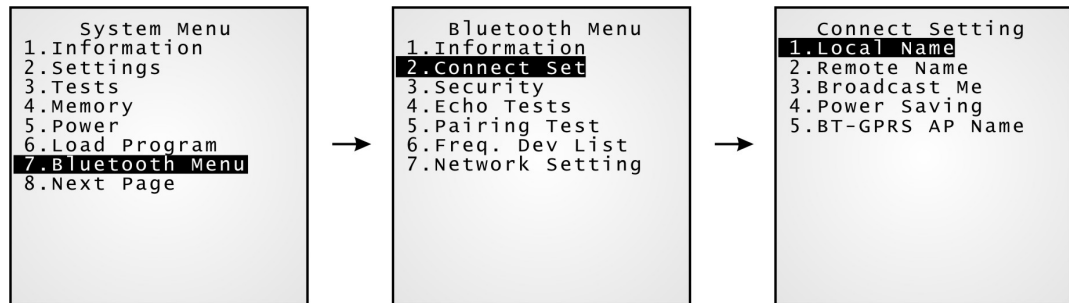
Bluetooth Menu > 2. Connect Set

1. Local Name	Enter a name for identifying the mobile computer.
	◆ By default, it is made up of model No. and the serial number.
2. Remote Name	Enter a name for making a specific connection.
	◆ The remote name must be one of those in the Freq. Dev. List. Otherwise, the mobile computer will fail to make a connection with any device without pairing.
	◆ DO NOT specify any remote name when roaming across different groups of APs is required.
3. Broadcast Me	Options - Enable or Disable
	◆ For initial connection, broadcasting must be enabled so that other Bluetooth devices can discover the mobile computer.
	◆ For security concerns, you may disable it in future use to hide the mobile computer from other Bluetooth devices.
4. Power Saving	This refers to the low power consumption mode.
	Options - Enable or Disable (Only the Sniff mode is supported.)
5. BT-GPRS AP Name	For DUN-GPRS mode, enter the AP name for connecting to the content server.

Bluetooth Menu > Security

Set or modify security parameters.

```
    System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
   Bluetooth Menu
1.Information
2.Connect Set
3.Security
4.Echo Tests
5.Pairing Test
6.Freq. Dev List
7.Network Setting
```
→
```
      Security
1.Authentication
2.PIN Code
```

Bluetooth Menu > 3. Security

1. Authentication	Options - Enable or Disable
2. PIN Code	Define the encryption key values.
	◆ Up to 16 characters, using ASCII code.

Bluetooth Menu > Echo Tests

These echo tests are used for verifying connectivity to make sure the mobile computer is within coverage. Press [ESC] to stop and exit the test.

In PAN mode, the echo test helps measure the coverage of the range, estimate the number of APs and mobile computers needed, and determine the topology of deploying APs.

- SPP: Serial Port Profile

    It is used for ad hoc networking, without going through any access point.

- DUN: Dial-Up Networking Profile

    DUN Modem - It makes use of a Bluetooth modem or mobile phone as a wireless modem.

    DUN GPRS – It makes use of a mobile phone with GPRS functionality and connects to GPRS AP.

- BNEP: Bluetooth Network Encapsulation Protocol

    It is used by Personal Area Networking Profile (PAN) for IP networking over Bluetooth.

```
     System Menu              Bluetooth Menu               Echo Tests
1.Information            1.Information            1.SPP Master
2.Settings              2.Connect Set            2.SPP Slave
3.Tests                 3.Security               3.DUN Modem
4.Memory          →     4.Echo Tests       →     4.DUN GPRS
5.Power                 5.Pairing Test           5.BNEP Client
6.Load Program          6.Freq. Dev List         6.BNEP Server
7.Bluetooth Menu        7.Network Setting
8.Next Page
```
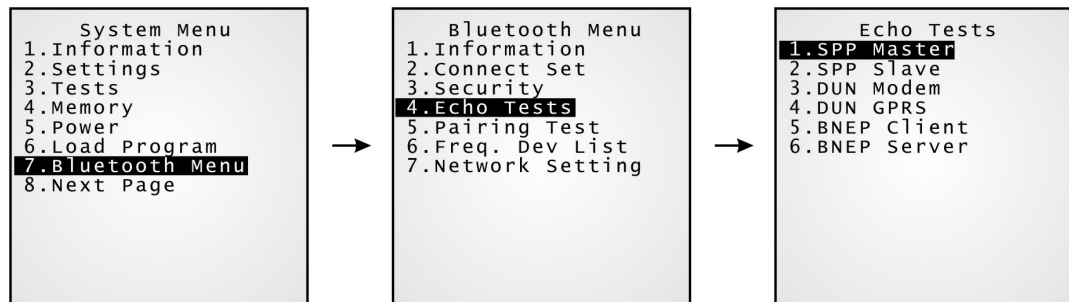
Bluetooth Menu > 4. Echo Tests

1. SPP Master	Set the mobile computer as a master device.

1. Pairing with your computer (slave) must be completed first.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "RS-232" for interface.

   - Use the Bluetooth COM port that has been paired.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends. The mobile computer will try to connect to PC (slave).

2. SPP Slave   Set the mobile computer as a slave device.

1. Enable Authentication and set your PIN code on the mobile computer.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "RS-232" for interface.

   - Use the Bluetooth COM port that has been configured as "outgoing".

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. The mobile computer will wait for PC (master) to start the connection.

5. Enter the preset PIN code for authentication on your computer.

3. DUN Modem   The mobile computer will try to connect to a Bluetooth modem or mobile phone.

1. Pairing with your mobile phone must be completed first. Select "DialUp Network" for Target Machine options.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "Modem" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. The mobile computer will connect to your mobile phone that dials up to your computer.

4. DUN GPRS   The mobile computer will try to connect to a mobile phone with GPRS functionality.

1. Pairing with your mobile phone must be completed first. Select "DialUp Network" for Target Machine options.

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Server" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. Enter the server IP on the mobile computer.

5. The mobile computer will connect to your mobile phone that dials up a GPRS AP, and finally connect to your computer (server) through the GPRS AP.

5. BNEP Client   Set the mobile computer as a client. Enter the IP address of a server with which a connection is desired. Then, it will try to connect to an AP.

1. Pairing with an AP must be completed first. Select "Access Point" for Target Machine options. Note that you must disable Authentication and clear the preset PIN code when connecting to Bluetooth AP (3560).

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Server" for interface.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

4. Enter the server IP and port number on the mobile computer.

6. BNEP Server   Set the mobile computer as a server. It will try to connect to an AP.

1. Pairing with an AP must be completed first. Select "Access Point" for Target Machine options. Note that you must disable Authentication and clear the preset PIN code when connecting to Bluetooth AP (3560).

2. Run the Echo Test program on your computer. Associated settings include

   - Select "TCP/IP – Client" for interface.

   - Enter Remote IP and port number.

   - Set Action Mode to "Passive".

3. Start the echo test on both ends.

Bluetooth Menu > Pairing Test

The pairing procedure is for the creation and exchange of a link key between two Bluetooth-enabled devices. The devices use the link key for future authentication when exchanging information.

```
     System Menu              Bluetooth Menu          ====================
 1.Information            1.Information
 2.Settings               2.Connect Set                    Inquiry...
 3.Tests                  3.Security                      Please wait
 4.Memory                 4.Echo Tests
 5.Power             →    5.Pairing Test           →  ====================
 6.Load Program           6.Freq. Dev List
 7.Bluetooth Menu         7.Network Setting
 8.Next Page
```
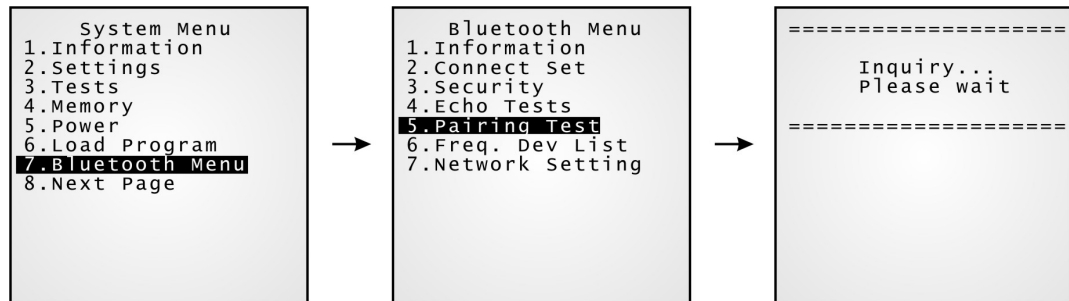
Bluetooth Menu > 5. Pairing Test

1. The mobile computer will first start with making an inquiry so that the system can generate a list of device(s) that has been discovered nearby.

2. Secondly, select a desired target device.

3. Then, select a Bluetooth service from the "Target Machine" menu. To stop and exit the test, press [ESC].

◆ Serial Port (SPP)

◆ Access Point (PAN)

◆ DialUp Network (DUN)

4. After pairing successfully, the target device will be added to the Frequent Device List for quick connection in the future.

Note: During the initial setting of Bluetooth wireless network, the pairing procedure must be carried out before the Echo tests.

Bluetooth Menu > Freq. Dev. List

The Frequent Device List is used to store a list of target device(s) that the mobile computer has been connected to lately. After each successful pairing, the system will update the list.

Note: To unpair any device, simply delete the device from this list.

```
    System Menu          Bluetooth Menu          No Device
1.Information         1.Information              in List!!
2.Settings            2.Connect Set
3.Tests               3.Security
4.Memory              4.Echo Tests
5.Power               5.Pairing Test
6.Load Program    →   6.Freq. Dev List    →
7.Bluetooth Menu      7.Network Setting
8.Next Page
```

Bluetooth Menu > 6. Freq. Dev List

This list can show information of up to eight target devices that provides different Bluetooth services.

- It can list only one device that provides the Bluetooth Serial Port service. (SPP)
- It can list up to eight APs that provide the Bluetooth Personal Area Networking service. (PAN)
- It can list only one device that provides the Bluetooth Dial-Up Networking service. (DUN)

Note: During roaming (for PAN only) or re-establishing the connection, the mobile computer will automatically connect to the listed AP(s) or target device without going through the pairing procedure.

Bluetooth Menu > Network Setting

Set parameters for IP networking.

```
     System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    Bluetooth Menu
1.Information
2.Connect Set
3.Security
4.Echo Tests
5.Pairing Test
6.Freq. Dev List
7.Network Setting
```
→
```
   Network Setting
1.DHCP
2.SubNet Mask
3.Local IP Address
4.Default Gateway
5.DNS Server
6.Domain Name
```

Bluetooth Menu > 7. Network Setting

1. DHCP	Options - Enable or Disable
2. SubNet Mask	Enter a new Mask IP, if necessary.
3. Local IP Address	Enter a new address for the mobile computer, if necessary.
4. Default Gateway	Enter a new address for the default Gateway, if necessary.
5. DNS Server	Enter a new address for the DNS server, if necessary.
6. Domain Name	The domain name of the host is shown here when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.

4.1.8(1) Serial PPP Menu

This submenu is for establishing a PPP connection via the Modem Cradle. You must configure these parameters correctly.

```
      System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```

→

```
      System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
    Serial PPP Menu
1.Information
2.Connection Set
3.Echo Test
```

Note: Point-to-Point Protocol (PPP) is a method of connecting the mobile computer to the Internet over serial links. It sends TCP/IP packets to a server that connects to the Internet.

Serial PPP Menu > Information

```
      System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
    Serial PPP Menu
1.Information
2.Connection Set
3.Echo Test
```

→

```
LIB:8500L-2.00
```

Information of library version can be viewed here.

Serial PPP Menu > 1. Information

LIB   C library version

   ◆   Identical to **System Menu** > **1. Information**

Serial PPP Menu > Connection Set

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
    Serial PPP Menu
1.Information
2.Connection Set
3.Echo Test
```

→

```
   Connection Setting
1.DialUp Number
2.Login Name
3.Login Password
4.Baud Rate
```
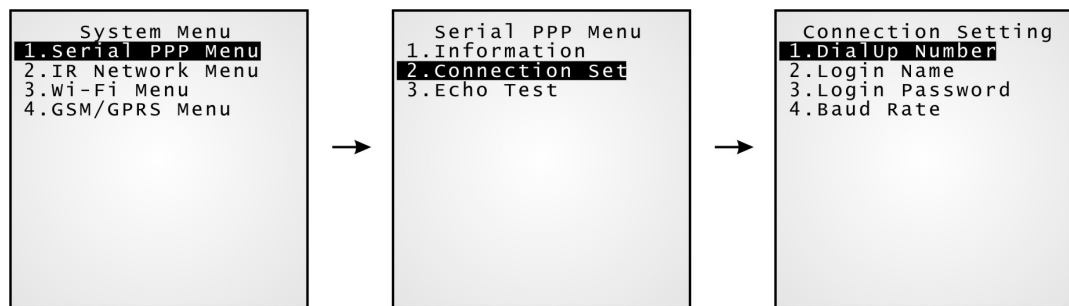
Serial PPP Menu > 2. Connection Set

1. DialUp Number	Enter the number provided by your ISP.
2. Login Name	Enter the login name provided by your ISP.
3. Login Password	Enter the login password provided by your ISP.
4. Baud Rate	Select a desired baud rate.

Note: By default, the baud rate is set to 57600 bps on the Modem Cradle.
For any other value, such as 115200/38400/19200/9600, you must configure through the DIP switch on the IR control board.

Serial PPP Menu > Echo Test

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
    Serial PPP Menu
1.Information
2.Connection Set
3.Echo Test
```

→

```
       Echo Test
=====================
Server IP:
62.64.64.0
```
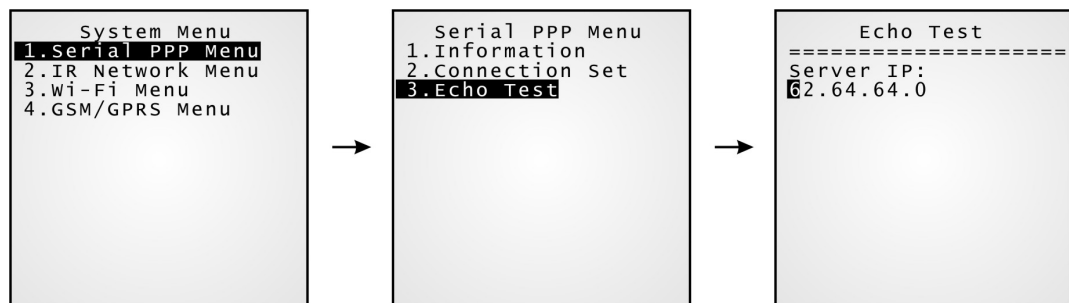
This echo test is used for verifying connectivity via Point-to-Point Protocol. For the Modem Cradle, its physical connectivity can be verified in System Menu > Tests > Echo Test > IR or MODEM.

Serial PPP Menu > 3. Echo Test

- ◆ Enter the IP address of a server with which a PPP connection is desired. Then, it will try to connect to the server.

Note: After the "PPP via IR" connection is established properly, run the utility "Echo Test" on your computer (TCP/IP – Server), and then, start this test on your mobile computer.

4.1.8(2) IR Network Menu (Ethernet via IR)

This submenu is for Ethernet connection via IR networking. You must configure these parameters correctly.

```
      System Menu            System Menu             IR Network Menu
1.Information           1.Serial PPP Menu      1.Information
2.Settings             2.IR Network Menu       2.Network Setting
3.Tests                3.Wi-Fi Menu            3.Echo Tests
4.Memory               4.GSM/GPRS Menu
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
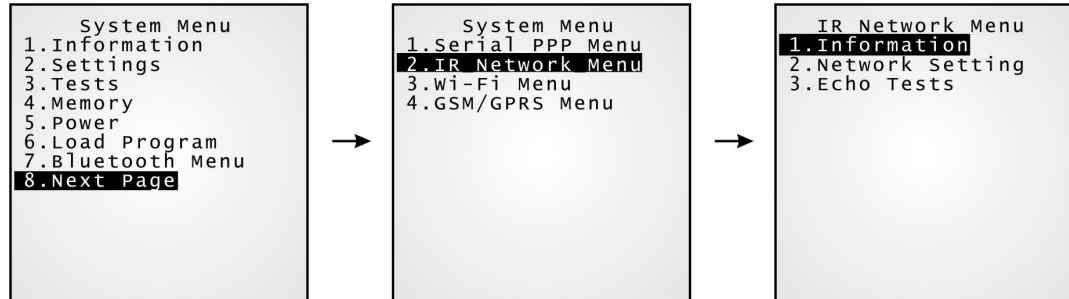
Note: The Ethernet Cradle is required for establishing Ethernet connection via IR.

IR Network Menu > Information

Information of Ethernet network configuration can be viewed here.

```
      System Menu            IR Network Menu         DHCP: Enable
1.Serial PPP Menu      1.Information           IP  : 0.0.0.0
2.IR Network Menu      2.Network Setting       Mask: 255.255.128.0
3.Wi-Fi Menu           3.Echo Tests            Gate: 0.0.0.0
4.GSM/GPRS Menu
```
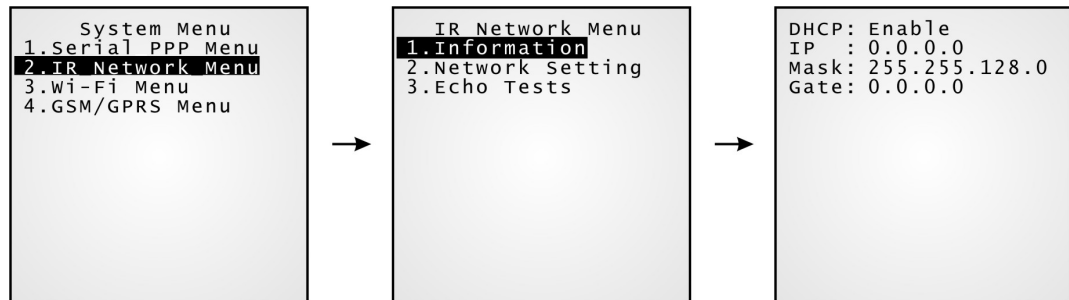
IR Network Menu > 1. Information

DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

IR Network Menu > Network Setting

Set parameters for IP networking.

```
      System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
    IR Network Menu
1.Information
2.Network Setting
3.Echo Tests
```

→

```
     Network Setting
1.DHCP
2.SubNet Mask
3.Local IP Address
4.Default Gateway
5.DNS Server
6.Domain Name
```
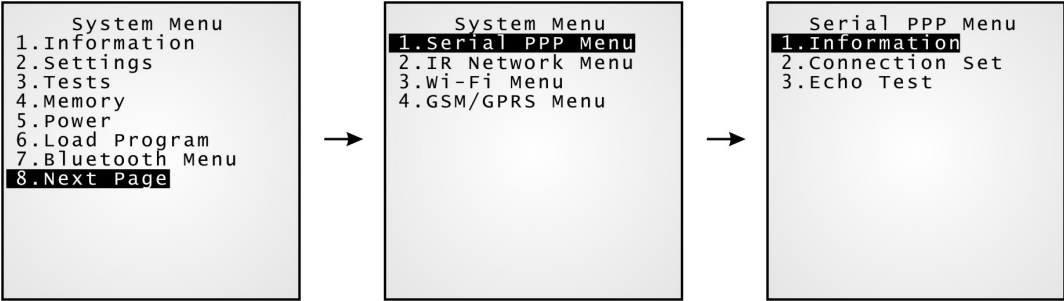
IR Network Menu > 2. Network Setting

1. DHCP	Options - Enable or Disable
2. SubNet Mask	Enter a new Mask IP, if necessary.
3. Local IP Address	Enter a new address for the mobile computer, if necessary.
4. Default Gateway	Enter a new address for the default Gateway, if necessary.
5. DNS Server	Enter a new address for the DNS server, if necessary.
6. Domain Name	The domain name of the host is shown here when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.
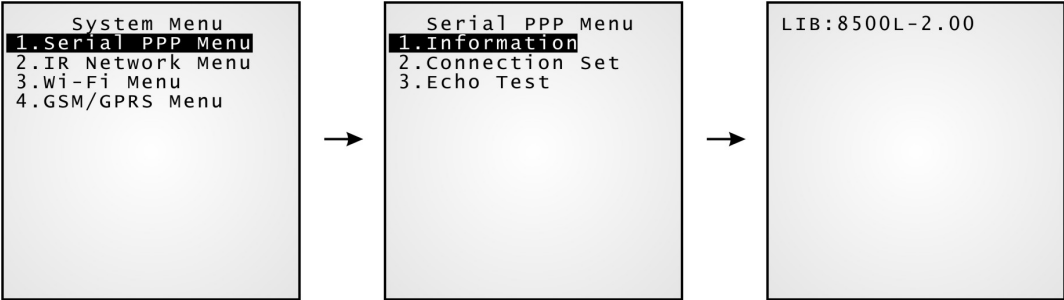
IR Network Menu > Echo Tests

The Ethernet Cradle supports three working modes:

- Data Mode
- Modem Mode
- Transparent Mode

These echo tests are used for verifying connectivity via the Ethernet Cradle. For details, refer to the Ethernet Cradle manual.

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
   IR Network Menu
1.Information
2.Network Setting
3.Echo Tests
```

→

```
     Echo Tests
1.Data Mode
2.Modem Mode
3.Transparent Mode
```

↓

```
     Echo Tests
1.Client Mode
2.Server Mode
```

IR Network Menu > 3. Echo Tests

1. Data Mode — Set the Ethernet Cradle in Data mode. The mobile computer works as a client. .

2. Modem Mode — Set the Ethernet Cradle in Modem mode. The mobile computer works as a client.

3. Transparent Mode — 1. Client Mode - Set the mobile computer as a client. Enter the IP address of a server with which a connection is desired.

2. Server Mode - Set the mobile computer as a server that waits for other devices to connect to.

Note: After the "Ethernet via IR" connection is established properly, run the utility "Echo Test" on your computer (TCP/IP – Server or Client), and then, start this test on your mobile computer.

4.1.8(3) Wi-Fi Menu

This submenu is for 802.11b/g wireless networking. You must configure these parameters correctly.

```
     System Menu            System Menu                Wi-Fi Menu
1.Information          1.Serial PPP Menu        1.Information
2.Settings            2.IR Network Menu        2.Network Setting
3.Tests               3.Wi-Fi Menu             3.WLAN Setting
4.Memory              4.GSM/GPRS Menu          4.Security
5.Power                                        5.Echo Tests
6.Load Program
7.Bluetooth Menu
8.Next Page
```
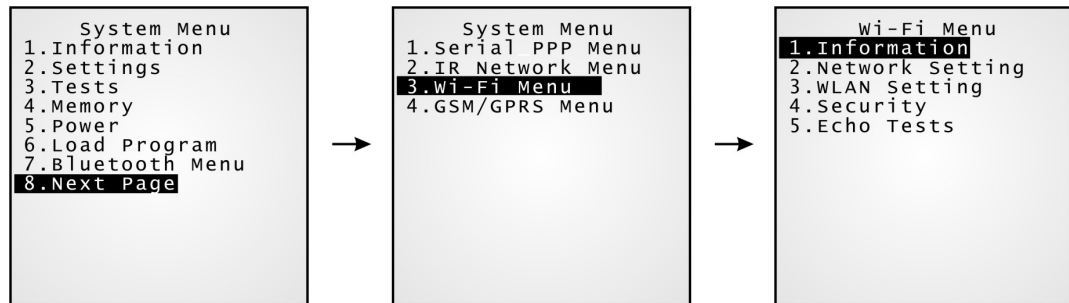
Note: This submenu is generated only when the Wi-Fi module is present.

Wi-Fi Settings	Default Value	Ad-hoc	Infrastructure
Network Setting		**Items Need to Be Checked**	
DHCP	Enabled	---	v
SubNet Mask	255.255.128.0	v	v
Local IP Address	0.0.0.0	v	v
Default Gateway	0.0.0.0	---	v
DNS Server	0.0.0.0	---	v
Domain Name	---	---	v
WLAN Setting			
Local Name	Model no. + Serial no.	v	v
SS ID	---	---	v
System Scale	Medium	---	v
Power Saving	Enabled	---	v
Preamble	Long	---	v
Ad-Hoc	Disabled	v	---
Security			
Authentication	Open System	---	v
WEP Menu	Disabled	---	v
EAP Menu	Disabled	---	v

Wi-Fi Menu > Information

Information of network configuration can be viewed here.

```
      System Menu              Wi-Fi Menu              Ver:0.00
1.Serial PPP Menu         1.Information               MAC : 000b6b1aa747
2.IR Network Menu         2.Network Setting           ID  : 8500cipherlab
3.Wi-Fi Menu              3.WLAN Setting              DHCP: Enable
4.GSM/GPRS Menu           4.Security                  IP  : 0.0.0.0
                          5.Echo Tests                Mask: 255.255.128.0
                                                      Gate: 0.0.0.0

             →                          →
```
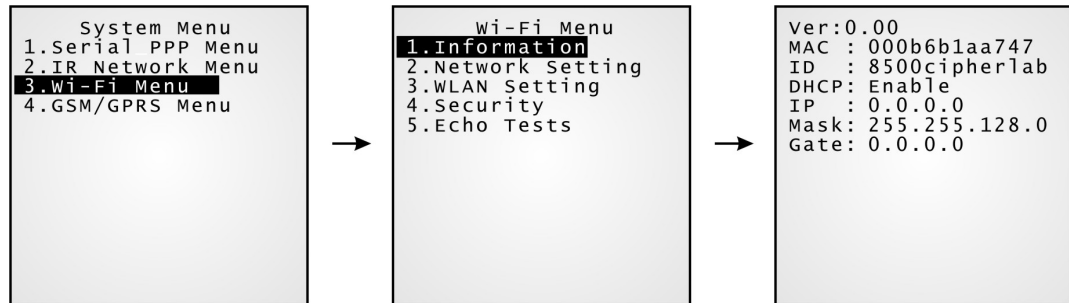
Wi-Fi Menu > 1. Information

Ver	Firmware version of the module chipset
MAC	MAC ID of the 802.11b/g module
ID	A name given to the mobile computer for identification.
	◆ By default, it is made up of model No. and the serial number. (Identical to 3. WLAN Setting > 1. Local Name)
DHCP	DHCP server in use or not
IP	IP address of the mobile computer
Mask	Subnet Mask
Gate	Default Gateway

Wi-Fi Menu > Network Setting

Set parameters for IP networking.

```
      System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
      Wi-Fi Menu
1.Information
2.Network Setting
3.WLAN Setting
4.Security
5.Echo Tests
```

→

```
   Network Setting
1.DHCP
2.SubNet Mask
3.Local IP Address
4.Default Gateway
5.DNS Server
6.Domain Name
```
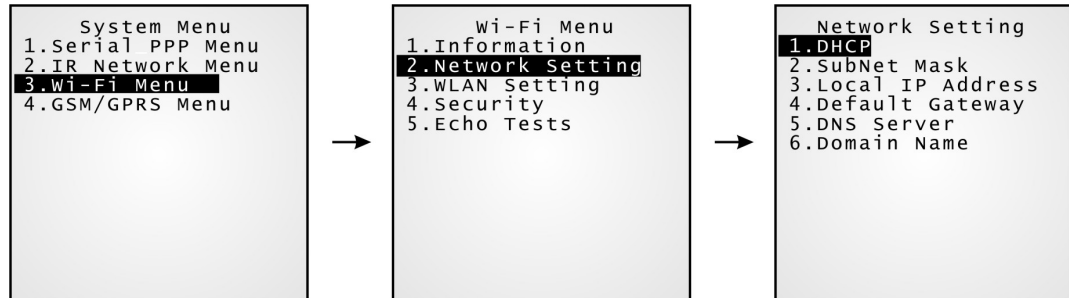
Wi-Fi Menu > 2. Network Setting

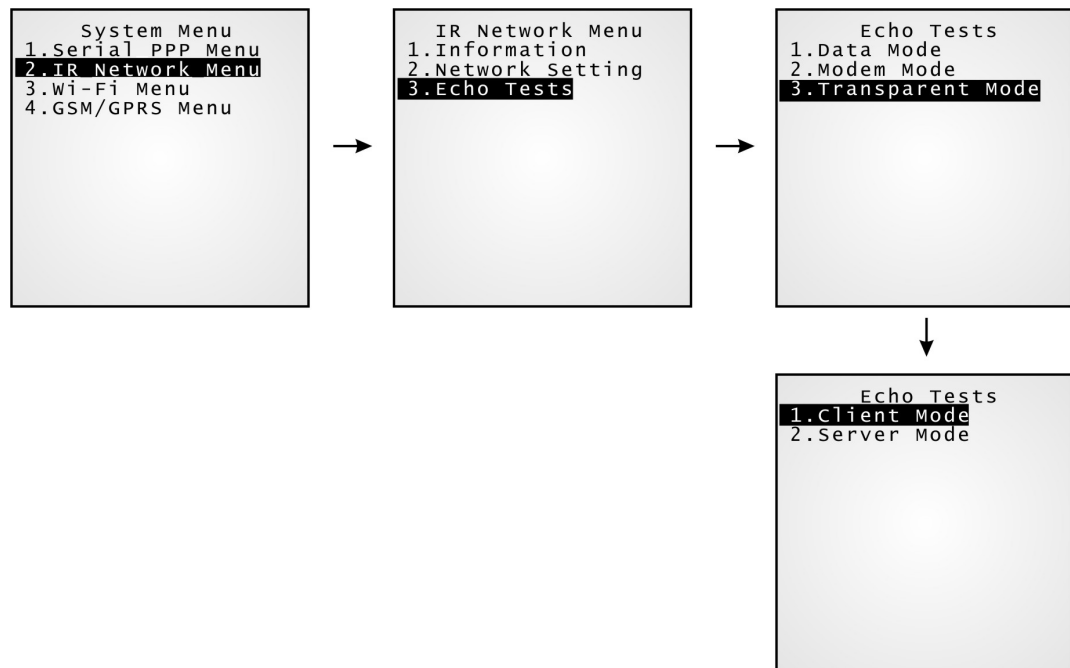|	
1. DHCP	Options - Enable or Disable
2. SubNet Mask	Enter a new Mask IP, if necessary.
3. Local IP	Enter a new address for the mobile computer, if necessary.
4. Gateway	Enter a new address for the default Gateway, if necessary.
5. DNS Server	Enter a new address for the DNS server, if necessary.
6. Domain Name	The domain name of the host is shown here when DHCP server is enabled.

Note: Normally, DHCP is enabled and all of the settings can be obtained form the DHCP server.

Wi-Fi Menu > WLAN Setting

Wireless networking can operate in two modes – (1) Ad-hoc mode: peer-to-peer, and (2) Infrastructure mode: point to multi-point through access points.

Set the following parameters.

```
    System Menu              Wi-Fi Menu               WLAN Setting
1.Serial PPP Menu       1.Information            1.Local Name
2.IR Network Menu       2.Network Setting        2.SS ID
3.Wi-Fi Menu            3.WLAN Setting           3.System Scale
4.GSM/GPRS Menu         4.Security               4.Power Saving
                        5.Echo Tests             5.Preamble
                                                 6.Ad-Hoc
```

Wi-Fi Menu > 3. WLAN Setting

1. Local Name	Enter a name for identifying the mobile computer.
	◆ By default, it is made up of model No. and the serial number.
2. SS ID	This refers to Service Set ID or Identifier.
	◆ The mobile computer can ONLY communicate with access points that have the same SS ID.
3. System Scale	This refers to Access Point Density.
	Options - [1] Low [2] Medium [3] High
	◆ The value you set must match that set for the access point.
	◆ "Low / Medium / High" means the mobile computer will search for other APs only when data transmission rate is below "1 / 2 / 5" Mbps individually.
4. Power Saving	This refers to the low power consumption mode.
	Options - Enable or Disable
	◆ The value you set must match that set for the access point.
5. Preamble	Options - [1] Long [2] Short [3] Both
	◆ The value you set must match that set for the access point.
6. Ad-Hoc	This refers to peer-to-peer mode, without going through access points.
	Options - Enable or Disable

Wi-Fi Menu > Security

Set or modify security parameters.

- WEP: Wired Equivalent Privacy
- EAP: Extensible Authentication Protocol

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
     Wi-Fi Menu
1.Information
2.Network Setting
3.WLAN Setting
4.Security
5.Echo Tests
```
→
```
      Security
1.Authentication
2.WEP Menu
3.EAP Menu
4.WPA Menu
```
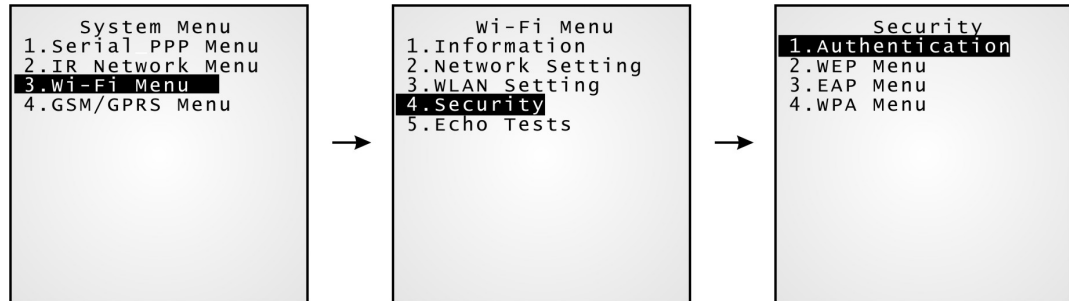
Wi-Fi Menu > 4. Security

1. Authentication	[1] Open System:	Default authentication type
	[0] Share Key:	This requires implementing WEP key.
2. WEP Menu	1. WEP Setting:	◆ Enabled (For Share Key, it must be enabled!)
		◆ Disabled (default)
	2. WEP Key Length:	◆ 64 bits
		◆ 128 bits (default)
	3. Default Key:	WEP KEY1
	4. WEP Key:	Enter WEP Keys 1 ~ 4 in one of the following input data type:
		◆ ASCII (up to 13 characters)
		◆ Hexadecimal (up to 26 characters)
3. EAP Menu	1. EAP Setting:	◆ Enabled
		◆ Disabled (default)
	2. EAP ID:	Enter a user name (up to 32 characters)
	3. EAP Password:	Enter a password (up to 32 characters)
4. WPA Menu	1. WPA Setting:	◆ Enabled
		◆ Disabled (default)
	2. WPA Passphrase:	Enter a phrase as your password (8 ~ 63 characters)

Wi-Fi Menu > Echo Tests

This function is used to measure the coverage of the range, estimate the number of APs and mobile computers needed, and determine the topology of deploying APs.

```
   System Menu              Wi-Fi Menu               Echo Tests
1.Serial PPP Menu        1.Information           1.Client Mode
2.IR Network Menu        2.Network Setting       2.Server Mode
3.Wi-Fi Menu             3.WLAN Setting
4.GSM/GPRS Menu          4.Security
                         5.Echo Tests
```
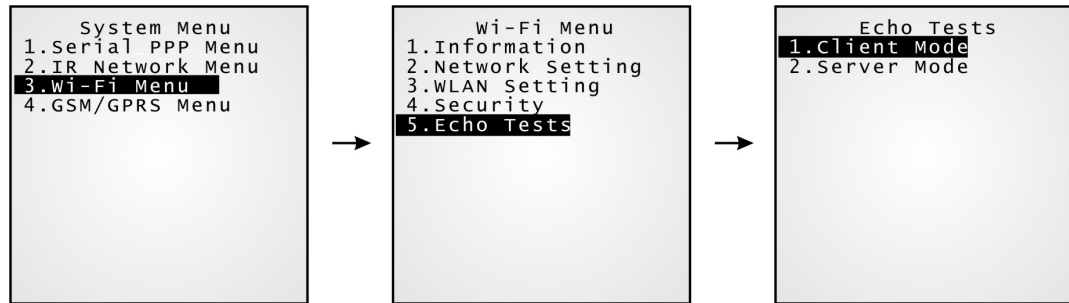
Wi-Fi Menu > 5. Echo Tests

1. Client Mode	Set the mobile computer as a client. Enter the IP address of a server with which a connection is desired. Then, it will try to connect to an AP.
	1. Run the Echo Test program on your computer. Associated settings include
	- Select "TCP/IP – Server" for interface.
	- Set Action Mode to "Passive".
	2. Start the echo test on both ends.
	3. Enter the server IP and port number on the mobile computer.
2. Server Mode	Set the mobile computer as a server. The mobile computer will try to connect to an AP.
	1. Run the Echo Test program on your computer. Associated settings include
	- Select "TCP/IP – Client" for interface.
	- Set Action Mode to "Passive".
	2. Start the echo test on both ends.

Note: Run the utility "Echo Test" on your computer (TCP/IP – Server or Client), and then, start this test on your mobile computer.

If WPA setting is enabled for security, the SSID and Passphrase will be processed to generate a pre-share key.

Note: If you change the SSID or Passphrase, it will have to re-generate a pre-share key.

1. For initial association with an access point, you will see an antenna icon developing on the screen to indicate that the mobile computer is processing a pre-share key.

2. After having generated the pre-share key, the mobile computer proceeds to establish a connection with an access point, and you will see the whole antenna is flashing.

3. When the mobile computer has been connected to the access point successfully, you will see the whole antenna and the indication of wireless signal strength.

```
        Wi-Fi Menu
  1 Information
  2 Network Setting
  3 WLAN Setting
  4 Security
  5 Echo Tests
```
→
```
        Echo Tests
  1 Client Mode
  2 Server Mode
```

These changing icons indicate it is processing a pre-share key.

Wait for a few seconds.

```
        Echo Test
  ====================
            Wait
      Connecting...

  ================
```

This flashing icon indicates it is connecting to an access point using the same SSID.

```
  Sending 412
  Recv OK  411




  Q:0084   T:36M
  S:0154   N:0008
```
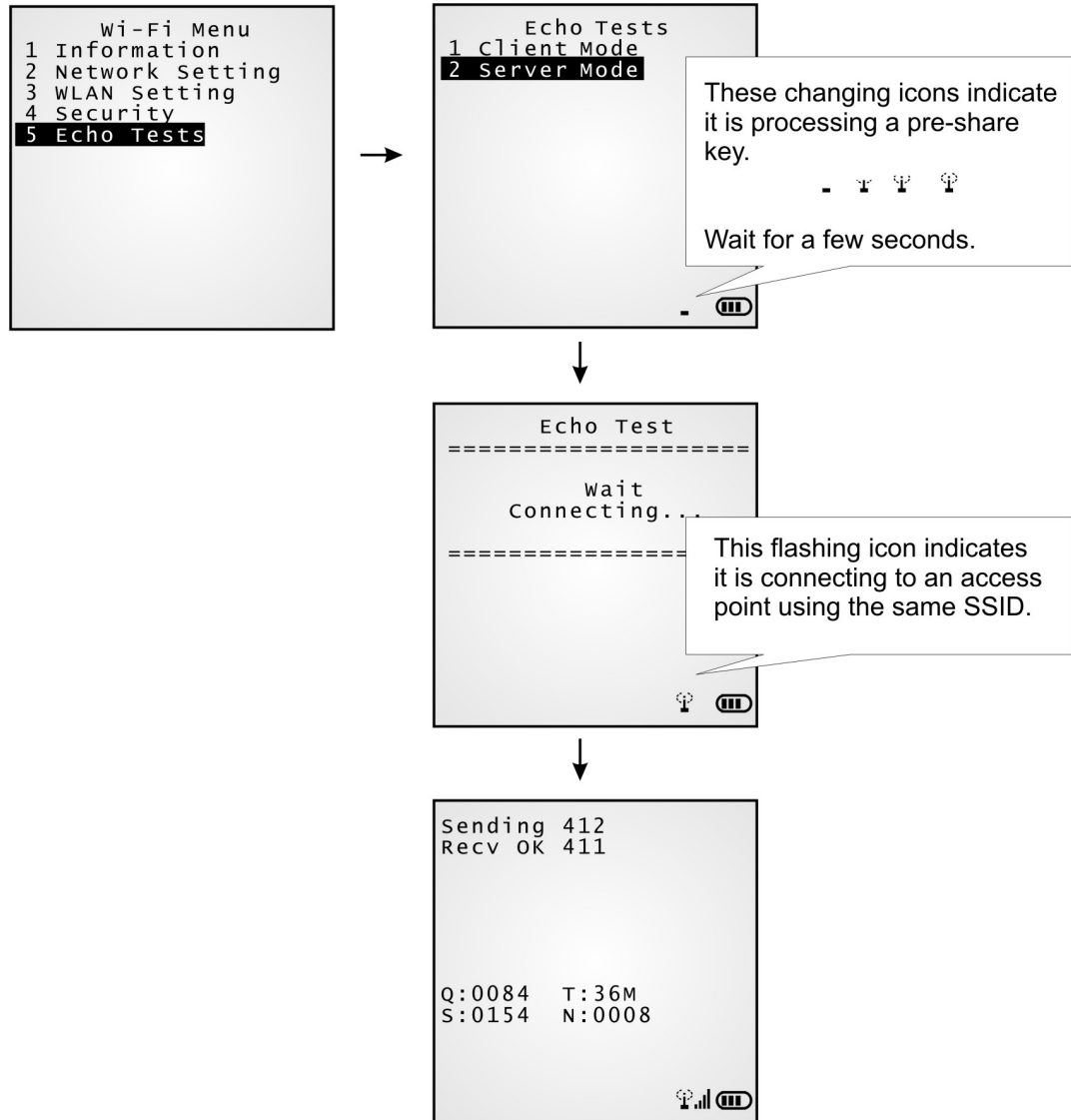
Note: If you are programming in C or BASIC, be aware that these icons will appear on the device screen after NetInit() or START TCPIP() is called. (WPA must be enabled first!)

Once the connection of echo test is established, the details will be displayed as illustrated below. Link Quality ("Q") will be the most important element while the others are for your reference.

```
Sending 412
Recv OK  411




Q:0084   T:36M
S:0154   N:0008


              ⊻.ıl ⫿⫿⫿⫿
```

Q (Link Quality)		T (Transmit Speed)		S (Signal Level)		N (Noise Level)	
0 ~ 10	Very Poor	1	Mbps	0 ~ 10	Weak	1	Weak
10 ~ 15	Poor	2	Mbps	30 ~ 60	Moderate	2 ~ 3	Moderate
15 ~ 30	Good	5.5	Mbps	Over 60	Strong	4 ~ 5	Strong
50 ~ 80	Very Good	11	Mbps				
		6	Mbps				
		9	Mbps				
		12	Mbps				
		18	Mbps				
		24	Mbps				
		36	Mbps				
		48	Mbps				
		54	Mbps				

4.1.8(4) GSM/GPRS Menu

This submenu is for GSM/GPRS networking. You must configure these parameters correctly.

The required information must be obtained from your GSM/GPRS network operator.

▪ GSM:

Data services of GSM, including SMS (Short Message Service) and data call, are provided for receiving and sending data.

▪ GPRS:

Through Access Points of GPRS, the mobile computer can establish a connection with the content server that connects to the Internet. Only client-initiated connection is supported.

```
    System Menu
1.Information
2.Settings
3.Tests
4.Memory
5.Power
6.Load Program
7.Bluetooth Menu
8.Next Page
```
→
```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
    GSM/GPRS Menu
1.Information
2.Security
3.GPRS Setting
4.GSM/GPRS Tests
```
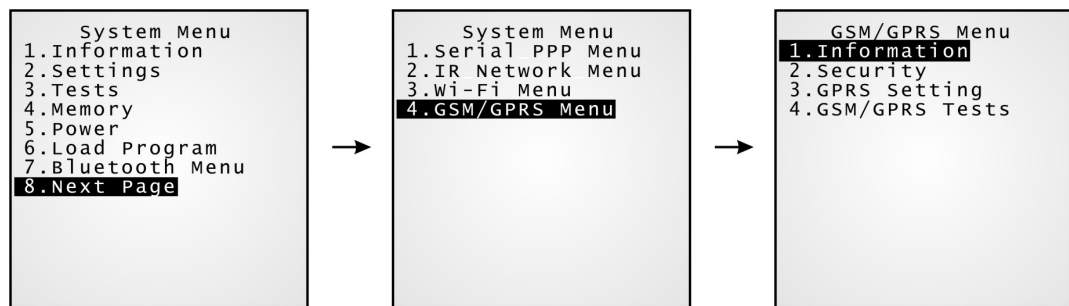
Note: This submenu is generated only when the GSM/GPRS card is present.

GSM/GPRS Menu > Information

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
    GSM/GPRS Menu
1.Information
2.Security
3.GPRS Setting
4.GSM/GPRS Tests
```
→
```
GSM Network
     :
PIN :Unknown
APN :
```
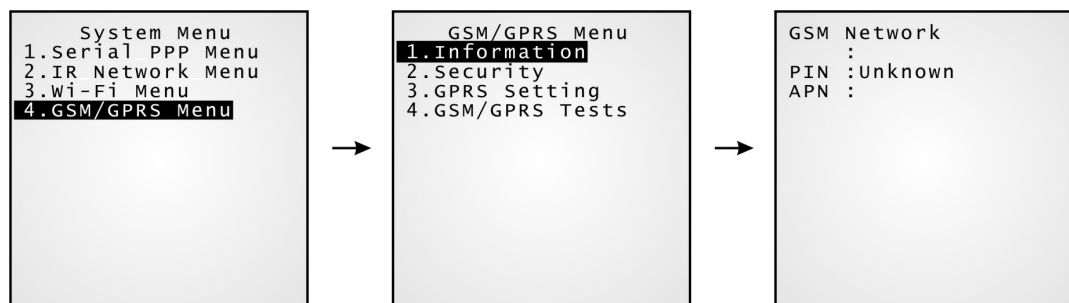
GSM / GPRS Menu > 1. Information

PIN	◆ Personal Identity Number of SIM card for security check. Undefined.
APN	◆ Access Point Name of your GPRS operator. Undefined.

GSM/GPRS Menu > Security

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   GSM/GPRS Menu
1.Information
2.Security
3.GPRS Setting
4.GSM/GPRS Tests
```
→
```
   Security Check

Enter PIN code:
```
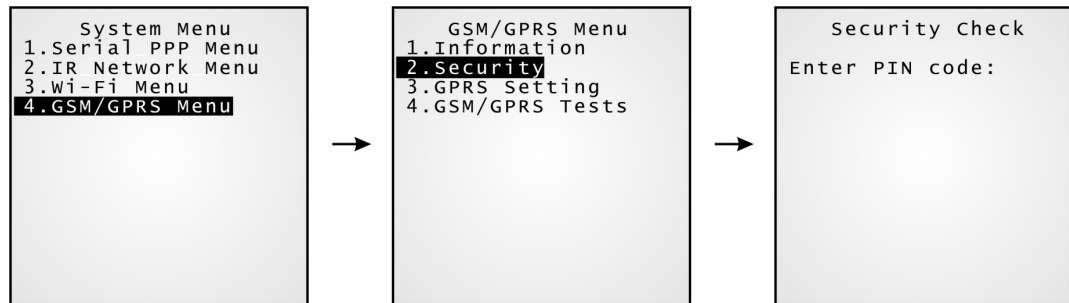
GSM / GPRS Menu > 2. Security

   ◆   Enter PIN code of SIM card.

GSM/GPRS Menu > GPRS Setting

```
    System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```
→
```
   GSM/GPRS Menu
1.Information
2.Security
3.GPRS Setting
4.GSM/GPRS Tests
```
→
```
    GPRS Setting
1.AP Name
```
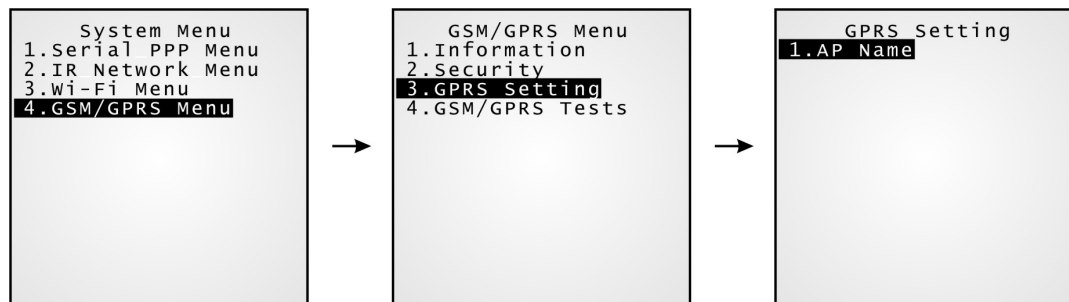
GSM / GPRS Menu > 3. GPRS Setting

1. AP Name   ◆   Enter the AP name of your GPRS operator.

GSM/GPRS Menu > GSM/GPRS Tests

```
     System Menu
1.Serial PPP Menu
2.IR Network Menu
3.Wi-Fi Menu
4.GSM/GPRS Menu
```

→

```
     GSM/GPRS Menu
1.Information
2.Security
3.GPRS Setting
4.GSM/GPRS Tests
```

→

```
     GSM/GPRS Test
1.GSM SMS Test
2.GSM Modem Echo
3.GPRS Client Mode
```
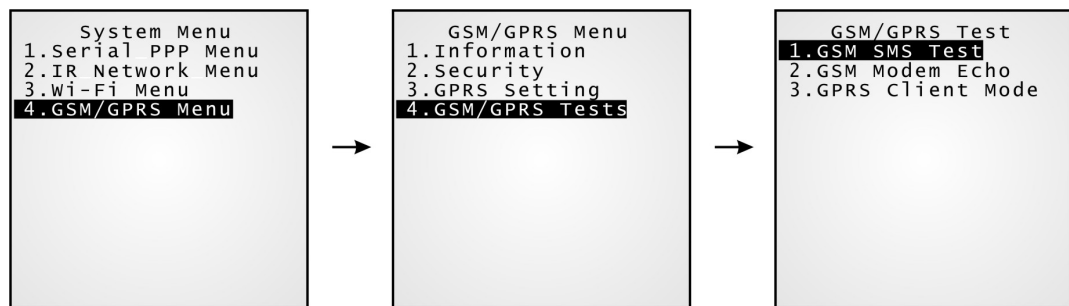
GSM / GPRS Menu > 4. GSM / GPRS Tests

1. GSM SMS Test
This GSM Sending Test is used to verify connectivity for Short Message Service. Enter a receiver telephone number on the mobile computer.

2. GSM Modem Echo
The mobile computer will try to connect to a GSM modem.

1. Run the Echo Test program on your computer. Associated settings include

  - Select "Modem" for interface.

  - Set Action Mode to "Passive".

2. Start the echo test on both ends.

3. Enter a receiver telephone number on the mobile computer.

4. The mobile computer will connect to the GSM modem that dials up your computer.

3. GPRS Client Mode
The mobile computer will try to connect to your GPRS service provider.

1. Run the Echo Test program on your computer. Associated settings include

  - Select "TCP/IP – Server" for interface.

  - Set Action Mode to "Passive".

2. Start the echo test on both ends.

3. Enter the server IP on the mobile computer.

4. The mobile computer will dials up to a GPRS AP, and finally connect to your computer (server) through the GPRS AP.

Note: Run the utility "Echo Test" on your computer (TCP/IP – Server or Client) or "TcpServer.exe" for GPRS Client Mode. Then, start this test on your mobile computer.

4.2 Program Manager

The 8500 Series supports multiple applications and languages. In the menu of **Program Manager**, it can download up to seven programs and one of them is made active.

If there is no application program exists, the **Program Manager** will be displayed after you turn on the mobile computer.

Warning!   The Program Manager menu is NOT for the use of any end users.

How to access the Program Manager menu?

1. Turn off the mobile computer.

2. Press [8] + [Power].


```
   Program Manager
1.Download
2.Activate
3.Upload
```

4.2.1 Download

Here provides a full list of programs that are currently stored on the mobile computer with size information. Multiple application programs can be downloaded through a variety of interfaces. Upon completion of downloading, you are allowed to input a name for the program. If there is no need to rename the program, simply press [ENTER] to leave as it is.

```
    Program Manager
 1.Download
 2.Activate
 3.Upload
```

```
          Download
 1.f Font JP-8500 192
 2.      _____
 3.      _____
 4.      _____
 5.      _____
 6.      _____
 ACT Unknown        192
```

```
      Download Via
 1.Cradle-IR
 2.IrDA
 3.Bluetooth
```

```
       Baud Rate
 1.115200    5.19200
 2.76800     6.9600
 3.57600     7.4800
 4.38400     8.2400
```
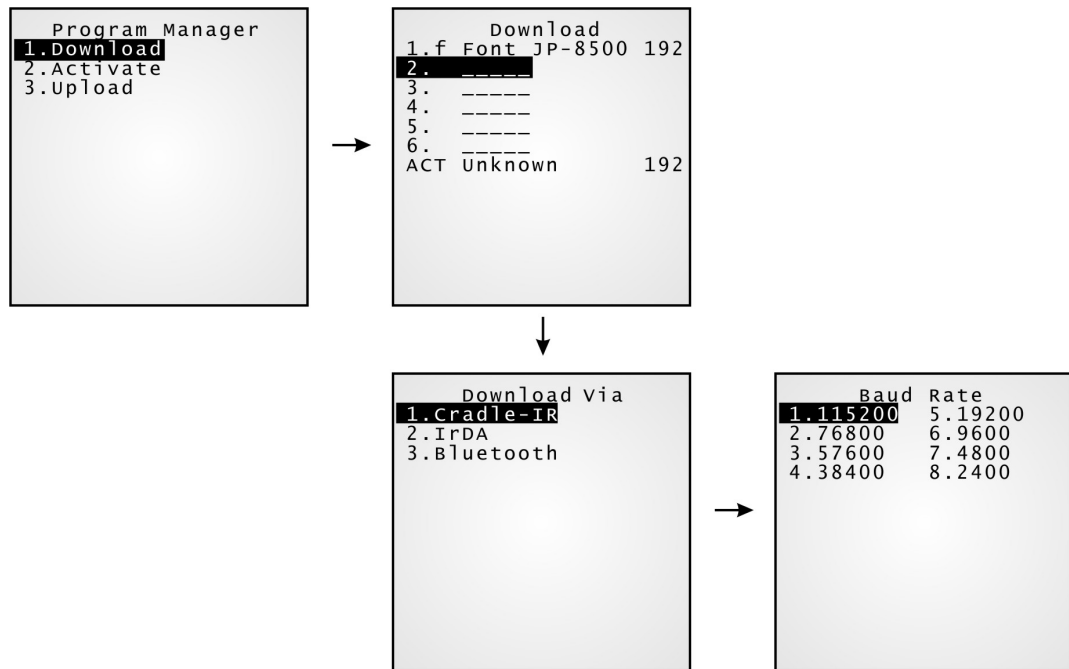
The length of program name can be up to 12 characters. Program size is in kilo bytes.

A suffix letter after the memory sector (1 ~ 6) indicates the file type of program.

- "b" for BASIC program   (.SYN)
- "c" for C program   (.SHX)
- "f" for font file   (.SHX)

Note: In addition to the system font, there can be only one font file downloaded to the mobile computer. The custom font file needs to be downloaded through the System Menu or Kernel Menu.

Spare Memory Sectors (1 ~ 6)

Additional program files can be directly downloaded to these sectors.

Download a program file to an empty sector:

1. Select an empty sector by pressing the corresponding number and then [Enter].

2. Select a desired baud rate for downloading.

3. Connect the RS-232 cable and wait for a few seconds to establish a connection…

4. To abort the action, press [ESC]. Then press [ESC] again to return to the menu.

Download a program file to an occupied sector:

If no available sectors, you'll have to replace one program with the new one.

1. Select a program that you want to delete by pressing the corresponding number and then [Enter].

2. The program information is displayed on the screen. Press [Alpha] to enter the Alpha mode, and then press [C].

3. Select a desired baud rate for downloading.

4. Connect the RS-232 cable and wait for a few seconds to establish a connection…

5. To abort the action, press [ESC]. Then press [ESC] again to return to the menu. From the menu, you'll find the program is deleted but no new program is present.

If you simply want to delete a program, press [D] in step 2.

Note: [C], [D] are NOT case-sensitive.

Active Memory Sector ("ACT")

Only the application program, which needs to be activated immediately, can be downloaded to the active memory sector.

Download to Memory Sector "ACT":

1. Press the [Down] key to select the memory sector "ACT" (may be unoccupied), and then press [Enter].

2. Connect the RS-232 cable and wait for a few seconds to establish a connection…

3. If the active memory sector has already been occupied by an application program, the newly downloaded program will replace the currently active program and come into effect immediately.

4.2.2 Activate

```
 ┌────────────────────────┐        ┌────────────────────────┐
 │    Program Manager      │        │    Activate Program     │
 │  1.Download             │        │ ▌1.f  Font JP-8500 192▐ │
 │ ▌2.Activate▐            │        │  2.    _____            │
 │  3.Upload               │        │  3.    _____            │
 │                         │        │  4.    _____            │
 │                    ──→  │        │  5.    _____            │
 │                         │        │  6.    _____            │
 │                         │        │                         │
 │                         │        │                         │
 └────────────────────────┘        └────────────────────────┘
```
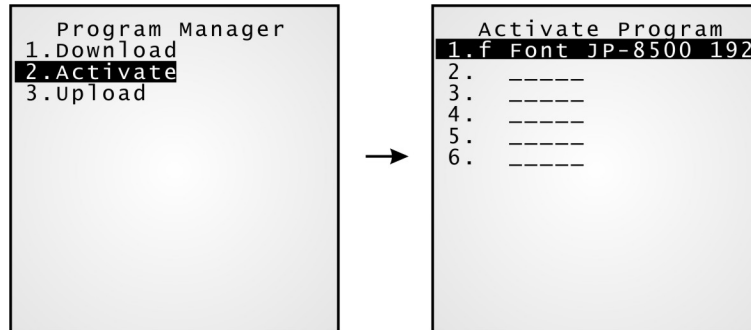
The list shows the entire spare programs stored on the mobile computer. From the list, you can select from 1 to 6 and activate one of them. The selected program will be copied to the active memory sector and replace the current one.

Note: A font file cannot be activated.

To Clear File System

When <New Program Start> screen prompts "Press [ESC] to clear file", it means the file system in the SRAM will be cleared out by pressing [ESC]. Then there will be no data (transactions, settings, etc.) stored on the mobile computer when the new program comes into effect.

To Keep File System

To keep the data, simply press any other key.

4.2.3 Upload

You may duplicate one or all of the programs from the mobile computer to a host computer or another mobile computer. This can be used to clone software on mobile computers.

Note: To clone all of the programs, the target mobile computer cannot have any other program downloaded except the active one; that is, Memory Sectors 1~6 must be empty!

The procedures are similar to those for downloading programs.
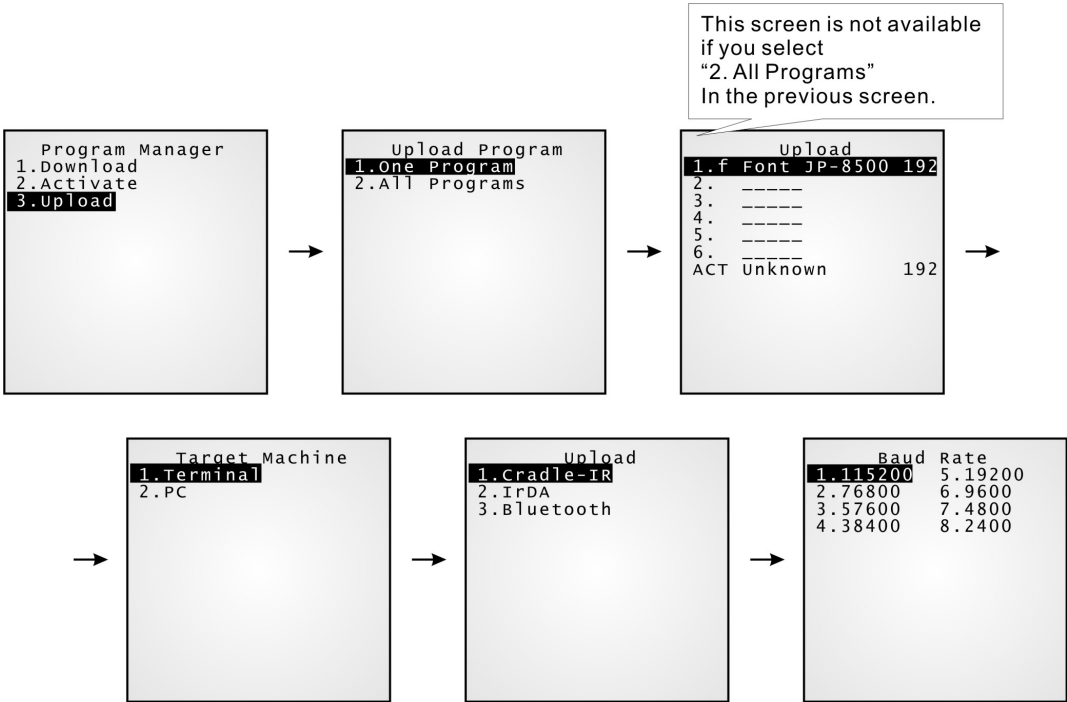
4.3 Kernel Menu

The kernel resides in the innermost core of the system. It has the highest security and is always protected by the system. When the application program is corrupted and the **System Menu** fails, the **Kernel Menu** provides an access to fix the system.

Warning!   The Kernel Menu is NOT for the use of any end users.

How to access the Kernel Menu?

1. When the last session is in the **System Menu** or **Program Manager**, simply turn off the mobile computer. Otherwise, you must reload the battery pack.

2. Press [1] + [7] + [Power].


```
        Kernel Menu
1.Kernel Information
2.Load Program
3.Kernel Update
4.Test & Calibrate
5.Bluetooth Menu
```

1 + 7 + ⏻

4.3.1 Kernel Information

Here provides important system information to help diagnose the system.

```
      Kernel Menu
 1.Kernel Information
 2.Load Program
 3.Kernel Update
 4.Test & Calibrate
 5.Bluetooth Menu


   →
```

```
 H/W: 8500-5
 S/N: 000079230
 M/D: 2006.01.18
 KNL: 8500K-2.00
 DEV: 1710 - 1
```
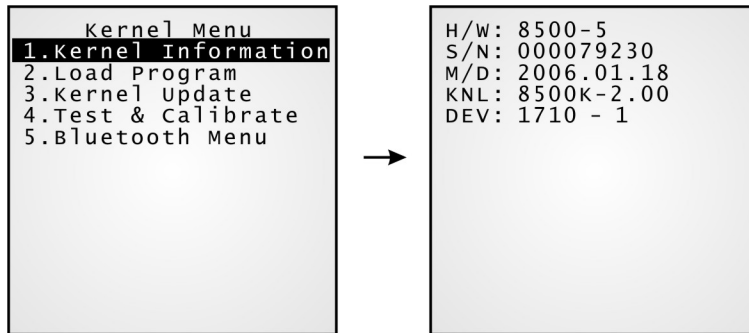
- H/W: Hardware version (PCB)
- S/N: Serial number of the mobile computer
- M/D: Manufacturing date
- KNL: Kernel version
- DEV: 5-digit code for optional hardware configurations

  For example, 1710-1 indicates the 44-key mobile computer is equipped with CCD scan engine, RFID reader, and 802.11b/g and GSM/GPRS connectivity.

  Refer to Understanding Device Code.

4.3.2 Load Program

You can download one program file to the active memory sector, as well as one font file to the memory address assigned by the system. After downloading, restart the mobile computer to activate the new program.

- New application program or program update
- And/or one font file, i.e. multi-language font

If you are using a custom font file rather the system font and you want to download another font file, it is necessary to delete the current font file from the program list displayed by the Program Manager first. Otherwise, downloading new font file is not allowed.
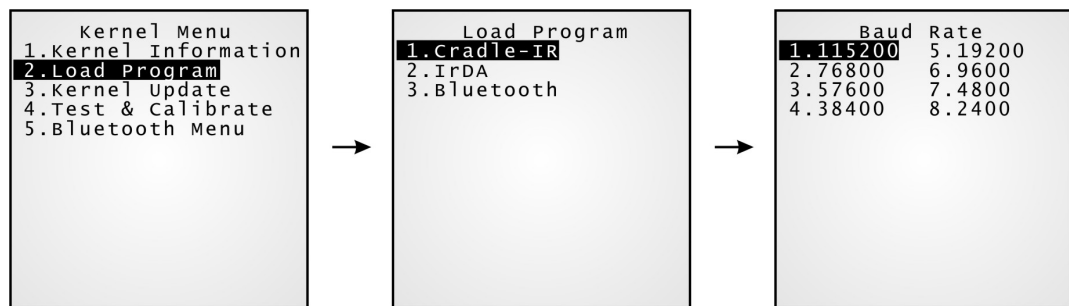
```
      Kernel Menu
1.Kernel Information
2.Load Program
3.Kernel Update
4.Test & Calibrate
5.Bluetooth Menu
```
→
```
      Load Program
1.Cradle-IR
2.IrDA
3.Bluetooth
```
→
```
       Baud Rate
1.115200   5.19200
2.76800    6.9600
3.57600    7.4800
4.38400    8.2400
```

.SHX Program	Download one of the following C program files and/or one font file:	
Program File	◆ AG Runtime	(U*.shx)
	◆ CipherNet Runtime	(85xx-5250.shx, 85xx-VT.shx)
	◆ BASIC Runtime*	(BC*.shx)
	◆ User program	
Font File	Refer to the Font Files folder on CD-ROM.	

If you have downloaded a BASIC Runtime program, the next time you access the Load Program service through the **System Menu**, you will be able to select whether to download a C program (.SHX) or BASIC program (.SYN).

Note: To download a BASIC program (*SYN), go to System Menu > 6. Load Program > 2. Load Basic.

Settings

Interface

Cradle-IR (Serial IR)	Proceed to configure baud rate settings on your computer and the mobile computer.
IrDA	Point to the target IrDA device.
Bluetooth	Approach the target Bluetooth enabled device.

Baud Rate

115200 (bps)	Supported on CipherLab software, including download utilities.
76800 (bps)	N/A
57600 (bps)	Supported on CipherLab software, including download utilities.
38400 (bps)	Supported on CipherLab software, including download utilities.
19200 (bps)	Supported on CipherLab software, including download utilities.
9600 (bps)	Supported on CipherLab software, including download utilities.
4800 (bps)	N/A
2400 (bps)	N/A

Note: If you select to use Serial IR of the Modem Cradle, any value other than 57600 bps (default) must be configured through the DIP switch on the IR control board.
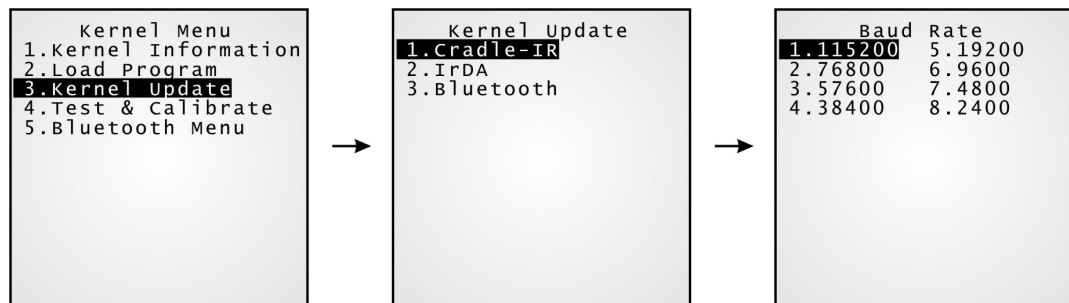
Load Program via Bluetooth

1. Go to **System Menu** > **7. Bluetooth Menu** > **3. Security**, and configure the following Bluetooth settings first.

- ▪ Authentication
- ▪ PIN code

2. Go to **System Menu** > **6. Load Program** and select Bluetooth.

3. Start the pairing procedure from your computer, for example, click [Pair Device] and/or [Connect Bluetooth Serial Port].

4. Run any of the download utilities: ProgLoad.exe or Download.exe

- Select interface RS-232/IrDA for using Bluetooth SPP.

- Select COM port properties that match with the serial port settings used on your computer.

4.3.3 Kernel Update

The kernel might need to be updated to improve performance or due to other considerations.

- To download a kernel update (K*.shx), the procedure is the same as that for downloading a program.
- Any attempt to download an older version will be rejected.
- The system will restart itself right after downloading.

Warning: Do not turn off the mobile computer while downloading a kernel update or re-starting the mobile computer. Otherwise, it will crash the kernel forever. There is no way to recover it!

```
     Kernel Menu
1.Kernel Information
2.Load Program
3.Kernel Update
4.Test & Calibrate
5.Bluetooth Menu
```
→
```
    Kernel Update
1.Cradle-IR
2.IrDA
3.Bluetooth
```
→
```
      Baud Rate
1.115200   5.19200
2.76800    6.9600
3.57600    7.4800
4.38400    8.2400
```

Note: CipherLab software, including download utilities, supports the following baud rate options: 115200/57600/38400/19200/9600 bps.

4.3.4 Test & Calibrate

These tools are provided for manufacturing use.

```
       Kernel Menu
1.Kernel Information
2.Load Program
3.Kernel Update
4.Test & Calibrate
5.Bluetooth Menu
```
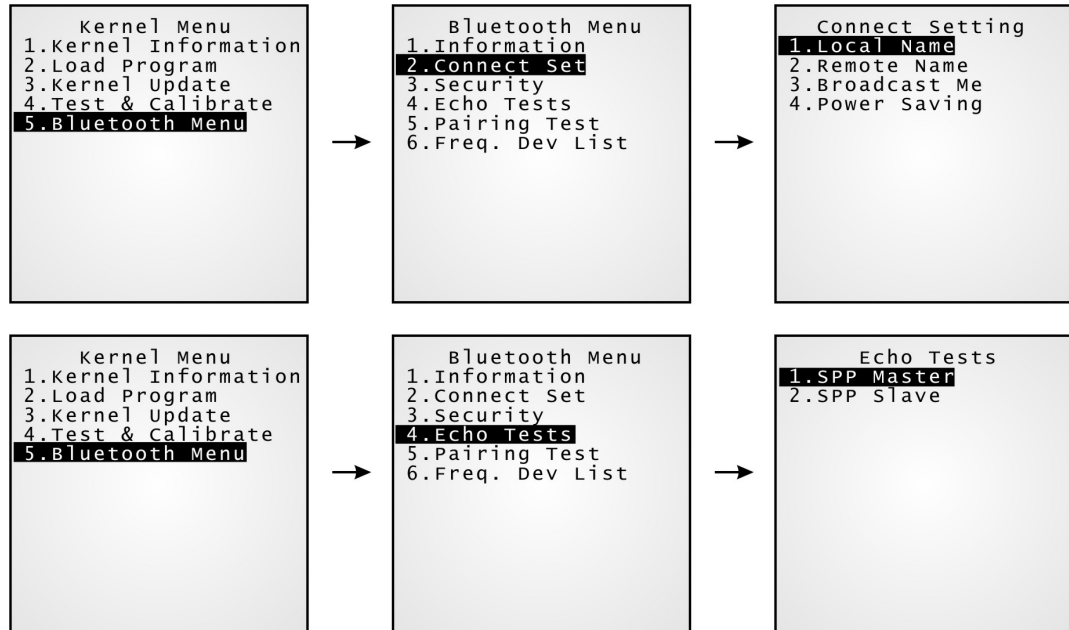
→

```
     Test & Calibrate
1.Burn-In Test
2.Calibrate RTC
3.Base RAM Test
4.Mem. Card Test
5.Scanner Test
6.Bluetooth Test
7.PCMCIA Test
8.LCD Test
```
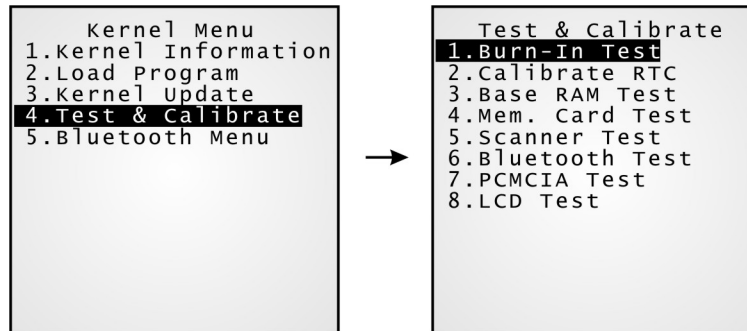
1. Burn-In Test

2. Calibrate RTC

3. Base RAM Test

4. Memory Card Test

5. Scanner Test

6. Bluetooth Test

7. PCMCIA Test

8. LCD Test

Warning!   You should not perform any of these tests.

4.3.5 Bluetooth Menu

This submenu is the same as the one under the **System Menu** except for the following items:

- "2. Connect Set > 5. BT-GPRS AP Name" is not provided.
- "4. Echo Tests" is provided with SPP options only.
- "7. Network Setting" is not provided.

```
     Kernel Menu             Bluetooth Menu          Connect Setting
1.Kernel Information    1.Information            1.Local Name
2.Load Program          2.Connect Set            2.Remote Name
3.Kernel Update         3.Security               3.Broadcast Me
4.Test & Calibrate      4.Echo Tests             4.Power Saving
5.Bluetooth Menu        5.Pairing Test
                        6.Freq. Dev List
```
→ → →

```
     Kernel Menu             Bluetooth Menu            Echo Tests
1.Kernel Information    1.Information            1.SPP Master
2.Load Program          2.Connect Set            2.SPP Slave
3.Kernel Update         3.Security
4.Test & Calibrate      4.Echo Tests
5.Bluetooth Menu        5.Pairing Test
                        6.Freq. Dev List
```
→ → →

Specifications

Model Designation		8500	8570	8580	8590
Wireless Communications	IR/IrDA	√	√	√	√
	Bluetooth Class 2	√	√	√	√
	802.11b/g	–	√	–	√
	GSM/GPRS	–	–	√	√
Electrical Characteristics	Main Battery	Rechargeable Li-ion battery – 3.7 V, 4000 mAh			
	Working Time	Laser, one scan per 5 seconds, with backlight on – ◆ 400 hours in batch mode ◆ 32 hours in Wi-Fi mode			
	Backup Battery	◆ Rechargeable Lithium button cell – 3.0 V, 7 mAh ◆ Data retention – at least 7 days			
Physical Characteristics	CPU	32-bit Toshiba CMOS type, 40 MHz			
	Memory	◆ Program memory – 2 MB flash ◆ Data memory – 2 MB SRAM, upgradeable			
	Display	Graphic LCD, 160 x 160 pixels, 3" FSTN with LED backlight programmable ◆ Font size 6x8: 26 characters by 19 lines ◆ Font size 8x16: 20 characters by 9 lines Also a touch screen allows for the use of stylus for control and signature capture.			
	Keypad	24 or 44 rubber keys, LED backlight programmable			
	Indicators	◆ LED – Dual-color (red/green), programmable ◆ Buzzer – Low power transducer type, 1 KHz to 4 KHz, programmable			
	Vibrator	9000 ± 2000 RPM, Max. 50 dB, programmable			
	Enclosure Material	Rubber & ABS plastic			
	Dimensions	230 mm (L) 91 mm (W) 65 mm (H)			
	Weight	Approx. 600 g **(Laser and battery included)**			
Readers	Barcode Reader	◆ CCD (linear imager) ◆ Standard Laser ◆ Long Range Laser ◆ Extra Long Range Laser ◆ 2D Imager			

	RFID Reader	Frequency 13.56 MHz	
Environmental Characteristics	**Operating Temperature**	-20 °C to 60 °C	-10 °C to 60 °C
	Storage Temperature	-30 °C to 70 °C	
	Operating Humidity	10% to 90% non-condensing	
	Storage Humidity	5% to 95% non-condensing	
	Impact Resistance	1.5 m, 5 drops per 6 sides	
	Splash / Dust Resistance	IP 64	
	Electrostatic Discharge	± 15 kV air discharge, ± 8 kV direct discharge	
	EMC Regulations	FCC, CE, C-Tick, DGT, BSMI, TELEC, MIC, RSS-210	
Programming	**Development Tools**	C and BASIC	
	Software & Utilities	Windows-based Application Generator (AG), AG utilities; Windows-based CipherNet for VT100/220, IBM 5250 emulation; Download utilities, testing tools, etc.	
Accessories		◆ 4 or 8 MB Memory Card ◆ Pistol Grip ◆ Belt Holster ◆ Protective Cover ◆ Spare rechargeable battery pack ◆ 4-slot Battery Charger ◆ Charging & Communication Cradle ◆ Modem Cradle (56 K) ◆ Ethernet Cradle (10/100 BASE-T) ◆ Vehicle Cradle ◆ Bluetooth Access Point ◆ 802.11b/g Access Point	

Troubleshooting

The mobile computer cannot be turned on when you press the POWER key…

- Make sure the battery pack is installed properly.
- Re-charge the battery inside the mobile computer and monitor the charging status. (see 4.1.5)
- If the battery is faulty, replace it with a fresh and fully charged battery then.

Charging error…

- Make sure the power cord is well connected between the cradle/charger and an outlet.
- Check if the battery contacts of the battery itself and the battery compartment are clean.
- Try to re-charge the battery and monitor the charging status.

Warning!   Only use batteries or charging device manufactured by CipherLab. The use of wrong battery or charging device could result in damage to human body or the product itself, and will void your warranty.

The keyboard input seems not working properly…

- Perform the keyboard test. (see 4.1.3)
- If the problem persists, slide the battery latch to reload the battery pack. Then perform the test again.

The reader does not scan…

Low battery -

- Check if the battery icon on the screen indicates a low battery status. If so, replace it with a fresh battery then.
- If the problem persists, check if the battery contacts get dirty or the battery pack does not fit to the compartment.

Regarding the reader -

- Perform the reader test to see if the reader is working. (see 4.1.3)
- If the problem persists, slide the battery latch to reload the battery pack. Then perform the test again.

The reader does not decode after scanning…

Unreadable barcode -

◆   Check if the barcode is defaced. A defaced barcode may not be readable.

Un-programmed to read -

◆   Check if the scanner is programmed to read the symbologies (types of barcode) that you are trying to read.
◆   Try scanning a test barcode of the symbology you are trying to read.

Dirty scan window-

◆   Check if the scan window gets dirty. Wipe it with a clean and dry cloth, and try again.

Out of scanning range -

◆   Try adjusting the scanning distance from the scanner to the barcode.

The mobile computer cannot transmit/receive data to/from a host computer or other devices…

Over IR port -

◆   Make sure the mobile computer's infrared port is pointed directly to the infrared port of another IR device. The distance between the mobile computer and a target device is within proper range, and no obstacles in between. Try to establish connection again.

Via Bluetooth -

◆   Make sure the distance between the mobile computer and a target device is within proper range. Try to establish connection again.
◆   Check if the relevant settings are correct. (see 4.1.7)
◆   Check if the connection is working properly. (see 4.1.7)

Over RS-232 port via cradle -

◆   Check if the RS-232 connection is correct and secured.
◆   Make sure the serial port parameters on the host are configured to match the serial parameters on the mobile computer. Try to establish connection again.
◆   Make sure the mobile computer is well seated inside the cradle. DO NOT remove the mobile computer or disconnect the cradle before communications are done.
◆   If the problem persists, run the IR Echo Test to check the IR interface between the mobile computer and the cradle. (see 4.1.3)

Over MODEM port via cradle -

◆   Check if the modem connection is correct and secured.

◆   Make sure the modem parameters are configured to match the parameters on the mobile computer. Try to establish connection again.

◆   Make sure the mobile computer is well seated inside the cradle. DO NOT remove the mobile computer or disconnect the cradle before communications are done.

◆   If the problem persists, run the IR Echo Test to check the IR interface between the mobile computer and the cradle. (see 4.1.3)

About abnormal response…

The LED or LCD seems not working properly -

◆   Perform the LCD & LED test. (see 4.1.3)

◆   If the problem persists, reload the battery pack and perform the test again.

The buzzer seems not working properly -

◆   Perform the buzzer test. (see 4.1.3)

◆   If the problem persists, reload the battery pack and perform the test again.

The mobile computer seems not working properly -

◆   First upload all data to a computer, and then perform the memory test. (see 4.1.3)

◆   If the problem persists, reload the battery pack and perform the test again.

The touch screen seems not working properly -

◆   Perform the touch screen test. (see 4.1.3)

◆   If the problem persists, reload the battery pack and perform the test again.

The vibrator seems not working properly -

◆   Perform the vibrator test. (see 4.1.3)

◆   If the problem persists, reload the battery pack and perform the test again.

A P P E N D I X   I

Download Utilities

The utilities are provided for you to download a program (*.SHX or *.SYN) to the mobile computer. Programs can be as follows:

Program Type		System Menu	Kernel Menu	Program Manager
AG Runtime	U*.SHX	√	√	√
CipherNet Runtime	85xx-VT.SHX 85xx-5250.SHX	√	√	√
BASIC Runtime	BC*.SHX	√	√	√
BASIC program	*.SYN	√	–	–
Font file	e.g. Font-Multi-Language.SHX	√	√	–
Kernel update	K*.SHX	–	√	–

Currently, the program ProgLoad.exe has replaced several previously released utilities as shown below.

- Download.exe   : to download a *.SHX file
- IRLoad.exe   : to download a *.SHX file
- SynLoad.exe   : to download a *.SYN file

ProgLoad.exe

This all-in-one utility supports all the file types and communications interfaces. Run the program on your computer. The following dialog box pops up.

Click to select Comm type, COM port, and Baud rate.

Choose your file…
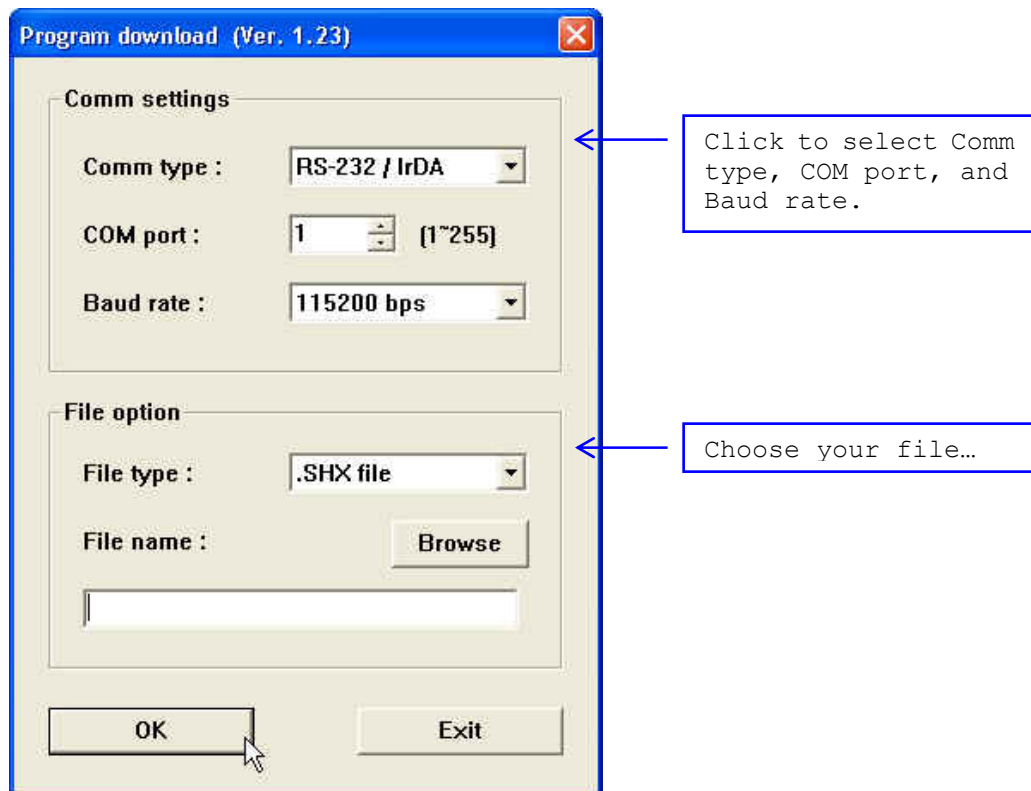
Communication Type

- RS-232 / IrDA: Connection via direct RS-232 cable, IrDA port, or Bluetooth SPP (= Download.exe)
- Serial IR: Connection via cradle (= IRLoad.exe)
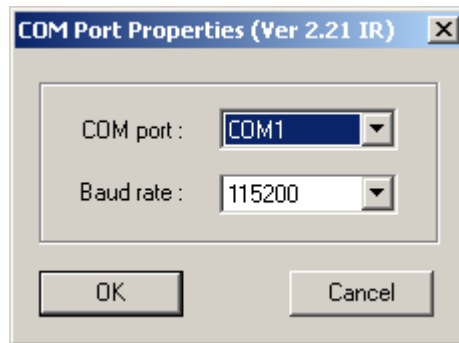- TCP/IP: Connection via networks (Not applicable!)

File Type

- *.SHX: Any C program, such as AG Runtime, Basic Runtime, font file, etc
- *.SYN: Any Basic program after Basic Runtime has been installed first

IRLoad.exe

This utility is provided when you establish a connection via the cradle.

1. Run the program on your computer.

2. Choose a .SHX file.

3. Select COM port properties.

Command Line

It also supports command line arguments. For example,

IRLOAD U8300-114.SHX,2,1//COM2,115200 bps

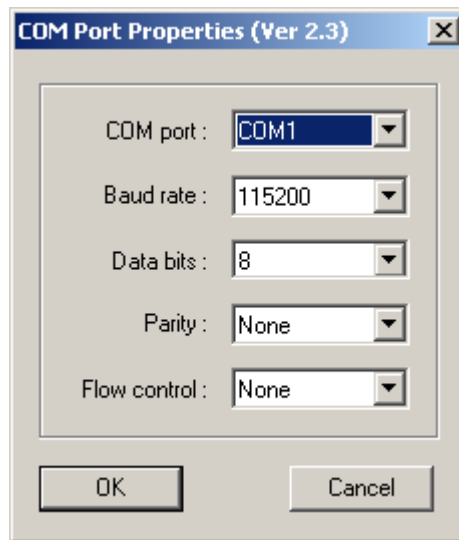If command line arguments are not given, the user can select appropriate parameters from the pop-up dialog box.

IRLOAD [filename],[COM port],[Baud rate]

File name:	The file name of the program that is to be downloaded.	
COM port:	1 ~ 8	Default: 1
Baud rate:	1 ~ 5 1 for 115200 bps	Default: 1
	2 for 57600 bps	
	3 for 38400 bps	
	4 for 19200 bps	
	5 for 9600 bps	

Download.exe

This utility is provided when you establish a connection via serial interface, such as a direct RS-232 cable, IrDA port, or Bluetooth SPP.

1. Run the program.

2. Choose a .SHX file.

3. Select COM port properties.

Command Line

It also supports command line arguments.